PRESENT STATUS OF SMALL-SCALE FISHERIES IN INDIA

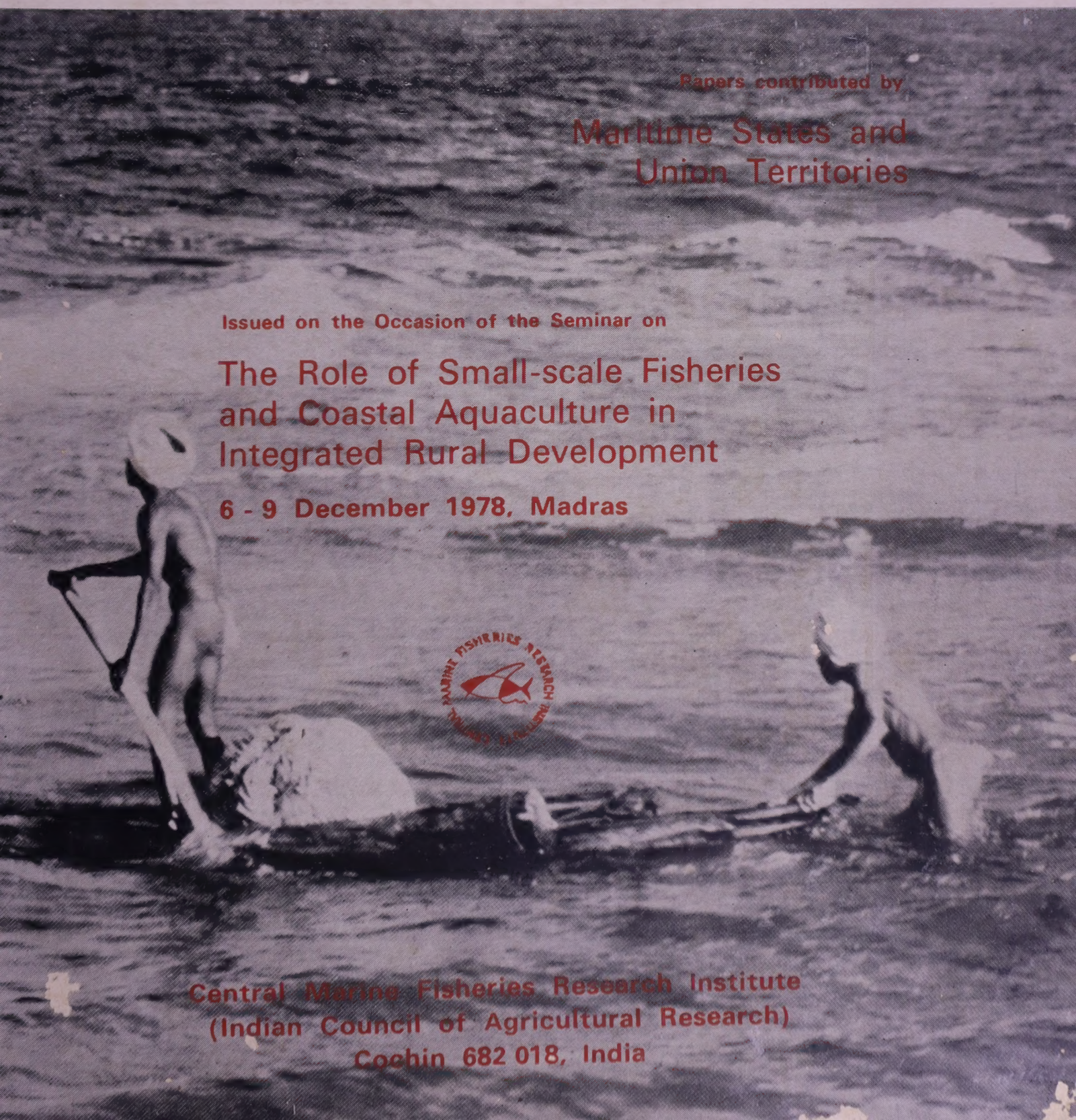
Papers contributed by

Maritime States and Union Territories

Issued on the Occasion of the Seminar on

The Role of Small-scale Fisheries and Coastal Aquaculture in Integrated Rural Development

6 - 9 December 1978, Madras



Central Marine Fisheries Research Institute
(Indian Council of Agricultural Research)
Cochin 682 018, India

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PREFACE

Sea fishing is the traditional occupation of the fishermen living along the coastline. Although started as an avocation for subsistence in the distant past, with the social changes, it became an occupation; people engaged in it formed distinct communities and the produce became a merchandise. The resource enjoying a place among the country's wealth is from comparatively recent times. The development schemes under the Five-Year and Annual Plans and the enterprise of the businessmen have raised the status of fishing to the level of an "Industry", with an added importance of a sizeable export segment in it.

While the entire marine fish catch of the country came from the traditional fisheries prior to 1951-the year when the phase of mechanisation commenced and development schemes were introduced (barring the mechanisation programme developed in Maharashtra in the mid forties), this sector at present accounts for about 60 per cent of the total marine fish catch. The mechanised fisheries has already started making inroads on this as in Karnataka. With a predominant rural base of our Society, the retention of the ratio of contribution by the small-scale fisheries around this level is essential to protect and improve the employment potential in the coastal sector. It has recently been realised that the small-scale fisheries offers twice the returns per unit of investment and generate almost seven times direct employment opportunities as compared to the mechanised sector.

Despite these facts, the impact of development programmes has not penetrated the matrix of the society of fishermen. There has not been much of a visible change in the fortunes of the artisanal fishermen. Their operational, living and social conditions remain by and large the same except for the adoption of synthetic fishing twine. It is time that we pay greater attention to this sector and plan and implement programmes with an accent towards uplifting their status through appropriate technological, financial and other infrastructural inputs. There should be a linkage of fisheries development with fishermen development. Such a plan would also lead to increased fish production. This realisation is not only at the national level but has assumed far-reaching significance in the world bodies concerned with fisheries development.

It is with this objective, the seminar on the "Role of Small-scale Fisheries and Coastal Aquaculture in Integrated Rural Development" has been organised by this Institute at Madras during 6-9 December 1978. Coastal Aquaculture is linked with small-scale fisheries because the former is one of the very few areas suited to be adopted by the fishermen as an additional avocation or as a full-time occupation. Such technologies and the concept of integrating the two structures of fisheries are recent in India and the benefits should logically and ethically accrue first to the small fishermen.

For all this, it is essential to have a sound information base on the present status of small-scale fisheries in India. Since the States have a direct responsibility for development of fisheries, it was decided to seek the first-hand information from the maritime States and Union Territories. Although the FAO/UNDP Project (Sri Lanka base) has prepared a general description of small-scale fisheries of India, a Status Report from the country itself has been lacking. The States and Union Territories responded to our request favourably. Although certain uniform presentation of facts and figures was suggested, due perhaps to shortness of time, the papers received are of varied nature. This problem has made us defer the original proposal for printing the papers. Publication of the book will be taken up immediately after full information on the various aspects of small-scale fisheries is gathered. However, as planned, the papers are brought out in the present form on the occasion of the Seminar to be available for the participants as a source of ready reference during discussions to evolve a strategy for the development of this sector. The arrangement of the papers is, for convenience, based on geographical location of the maritime States and Union Territories, starting from the north-west coast of India. Papers from West Bengal and Lakshadweep are awaited.

I must record my sincere thanks to Shri P. Basu, Commissioner of Fisheries, Gujarat, Shri A. G. Kalawar, Director of Fisheries, Maharashtra, Shri R. M. Dhawan, Director of Fisheries, Goa, Shri M. Jayaraj, Director of Fisheries, Karnataka, Shri S. N. Rao, Director of Fisheries, Kerala, Shri K. S. Ramakrishnan, Director of Fisheries, Tamil Nadu, Shri E. Purushothaman, Director of Fisheries, Pondicherry, Shri P. P. Williams, Director of Fisheries, Andhra Pradesh, Shri M. M. Mohanty, Director of Fisheries, Orissa and Dr. S. A. H. Abidi, Director of Fisheries, Andaman and Nicobar Islands for their cooperation with us in this project and for the papers. I must also thank Shri A. Sreenivasan (Tamil Nadu), Shri M. S. George (Karnataka) and Shri A. B. Roy (Orissa) for contributing papers for the respective States.

Dr. K. Alagarswami of this Institute took up the responsibility for bringing out this publication. I appreciate the efforts of all those who are associated with the publication of this volume.

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PRESENT STATUS OF SMALL-SCALE FISHERIES AND AQUACULTURE AND THE SCOPE OF THEIR DEVELOMENT UNDER THE RURAL DEVELOPMENT PROGRAMMES IN GUJARAT STATE

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INTRODUCTION

Gujarat has an excellent marine, inland and estuarine fisheries potential. This State enjoys an enviable position among all the maritime S+ates of the country in view of the long coastline of 1663 km and a vast seaboard. It has at its disposal about 1,65,000 Sq. km of continental shelf of which 65,000 Sq. km are within a range of 50 metres and the rest extending between 50 and 200 metres depth. Thus, about a third of the coastline and continental shelf area available to the Country is with Gujarat. Further, the discharge of several million cubic metres of flood waters into the sea in this region enrich the coastline of this State and, as a result, the sea abutting the State sustain some major commercially important fisheries, such as the Bombay duck, pomfrets, jew-fishes, threadfins, perches and commercially the most coveted shrimps.

In addition to the long sea coast, the State has about 3,67,000 hectares of estuarine and brackish water spread, several kilometres of river lengths, about 16,000 hectares of urban and rural fresh water sheets and about a lakh hectare of minor and major irrigation reservoirs which yield sizable quantity of estuarine and fresh water fishes, such as the grey mullets, perches, thread-fins, prawns and major and minor carps.

The State has been in the fore-front to exploit and utilise these natural resources and, thanks to its well-planned development programmes, has been able to increase its fish production sizeably. The fish production of the State which was a mere 80,000 tonnes at the incention of the State in 1960 has of late increased to about 2.35 lakh tonnes which amounts to about a tenth of the Nation's total fish catch.

This increased fish production and an expanded fisheries trade has been achieved not by the modern sophisticated trawlers alone. The traditional Small-scale fisheries also has made a substantial contribution to the achievements of the fisheries sector of the State. Therefore, the fi fisheries development agencies cannot afford to ignore the conventional and traditional small-scale fisheries and the persons involved therein, while planning for the development of fisheries sector in the State.

The Small-scale Fisheries of Gujarat

The State has a fishing fleet consisting of about 7,600 fishing boats scattered all along the coast. Of these only about 34% are mechanised and the rest are non-mechanised boats ranging from dugout and flat bottomed boats to plankbuilt Hodis, Lodiyas, Machwas and Vahans. These boats operate a great many types of conventional fishing gear such as cotton and hemp bagnets, cast nets, dragnets and gill nets. It is estimated that out of the 3.39 lakh units of fishing gear operated along the Gujarat coast, about 41% are conventional fishing gear including traps and cast nets. Thus it can be seen that even in spite of a great thrust of sophistication on the craft, gear and fishing methods, the conventional small-scale fisheries have been contributing a great deal to the fish landing of the State.

In this connection, it would not be out of place to recall the observations made by the National Commission on Agriculture that "The marine fishing in India has progressed during all these years using indigenous crafts for the exploitation of the waters immediately near the coastline". It has been very much so in Gujarat as to the gear and the method of fishing as well. Also, it continues to be so, as other than a few coastal pockets in Junagadh District and Bulsar District, by and large the fisheries of Gujarat is supported by traditional conservative small-scale fisheries.

The State has been quite aware of the role ' the small-scale fishermen and, therefore, has been quite sensitive to the problems of the traditional fishing. This can be seen from the fact that during the first three Five Year Plans, the main concentration was on the mechanisation of the indigenous fishing crafts and improvements of the traditional fishing crafts and about 50.5% of the financial outlay under these plans were earmarked and spent for these purposes alone. Liberal loans and subsidies were made available and, in view of this, the State could add 1304 mechanised boats and 408 improved designed boats to its fleet during the first three Five Year Plans.

Although the main emphasis of the 4th and 5th Plans was on the introduction on small and medium trawlers which could operate beyond the coastal waters, the conventional small-scale fisheries was given a due share in the financial apportioning, especially in the backward areas where trawling had not been and could not be adopted by the fishermen. This has resulted in adding up 1582 more mechanised and 834 non-mechanised

improved designed boats to the State's fishing fleet. Now that the State has done away with the scheme of subsidising the fishing boats, it has introduced a system of advancing Rs. 25,000/- as interest-free loan per boat with an initial mortorium of seven years. Similar State aid in the form of subsidy also is made available to the fishing gears and gear material.

Intensification and strengthening of the capture equipment alone cannot help the fishermen to improve their trade. Side by side, it is also essential to guarantee a proper distribution of fish and proportional and reasonable returns from the trade to the fishermen. This can be assured only if the fishermen are relieved of their indebtness towards the middlemen and merchants who appropriate a major share and cause a large debt to the income of the fishermen. This problem has been tackled to a fair extent in Gujarat by organising and strengthening the primary co-operatives and linking their activities to the Apex Co-operative Organisation * with an extensive sphere of operation. In addition to this, there are as many as 148 primary co-operatives and federation of about 15 primary Societies in South Gujarat, which have extensice operations including boat building.

With view to link up the primary society and the Apex Co-operative Organisation, it has now been decided to set up district level federations in all maritime districts which will meet the requirement of primary societies on the one hand and also serve as a link between the primary societies and the Apex Organisation.

* Gujarat has now on Apex Co-operative Organisation

Special Programmes

Fisheries is, by and large, confined to the rural coastal areas. However, unlike agriculture, animal husbandry, poultry, etc., fisheries was not given much attention so far in the rural development programmes or special area development programmes such as DPAP, SFDA, SFAL, etc. However, in view of the Department's sustained efforts, the concerned agencies are now considering the rural fisheries sector on par with the other sectors and the development of small-scale fisheries by small fish farmers has also been included in the DPAP and SFAL programmes of Kutch and Jamnager District and in the Integrated Rural Development Programme for Kutch.

Although a good many such small fishermen have been benefitted and they have procured the basic capture equipments such as boats and gears, these schemes are, by and large, dependable on the institutional finance. As the fishermen, poor as they are, may not be able to satisfy the rigid terms and conditions of the financing agencies, many of them are not able to raise the necessary loans for the purchase of boats and other materials. This results in their inability to take advantage of the subsidies available under the special programmes.

It is, therefore, very clear that these special programmes - which envisage liberal subsidy facilities - cannot be taken advantage of by fishermen unless the Nationalised banks and other financing agencies liberaise their rigid terms and conditions. In this connection, I feel it is high time we think about the formation of some special financing agencies to cater to the needs of the poor fishermen, as in the case of Agriculture. I am

sure, the fishermen elsewhere in the country also are facing similar problems. Hence it is advisable that there should be all-India level fisheries financing agency to cater to the credit needs of the small rural fishermen.

There has been a modest beginning in our State in this direction . A fisheries bank has just been floated very recently in Veraval and the same is awaiting clearance of the concerned authorities.

Coastal Aquaculture

As indicated in the earlier paragraphs, the potentialities of coastal aquaculture are excellent in Gujarat with sea coast blessed with many creeks, bays, mangrove swamps, estuaries and brackish water sheets. However, it is only recently that attempts have been initiated to utilise them for fish farming.

The first ever attempt in these lines was made in 1973 when M/S. Tata Chemicals Ltd. with the technical knowhow from this department, established an eight hectare farm in Aramda near Okha to rear euryhaline fishes. Although, it was difficult to get the juveniles of Penaeus mondon and P. indicus, the unit concentrated on the farming of grey mullets, milk-fish and cock-uns. The technical officers attached to the above unit made an elaborate survey of the coast line from Miani creek in the Saurashtra Peninsula to Pindara Bay in the southern coast of the Gulf of Kutch and gave an excellent report on the grey mullet fry resources in the said area and also, for the first time observed milk-fish fry from the Gomti estuary of Dwark, and harvested a good crop of the same.

Ever since the establishment of a marine fish farming project by the Tatas, other coastal areas of the State have also been surveyed with a view to assess the seed and physical potentialities of these areas.

The surveys resulted in the selection of another site for brackish water fish farm at Jodiya. This project costing about Rs. 16 lakhs, initiated as a Centrally Sponsored Scheme covers an area of 50 hectares and is progressing rapidly.

The Department has plans to develop brackish water fish farming at Mundra in Kutch District and Megham in Broach District and the necessary proposals have already been submitted to the Government.

Integrated Rural Development Programme

The Government of India has of late drawn up an Intensive Integrated Rural Development Programme. Ninety-six Blocks have been selected from the State under this programme for employment generation in the rural areas through productive schemes. Fisheries sector of the State has an important role to play in the programme. Fifty Blocks identified under this programme in the South Gujarat area have been selected for the development of inland fisheries in the rural water sheets spreed over 1,075 hectares. An amount of Rs. 86,00,000 is expected to be expended in this programme for the capital cost towards improvement of village tanks and for recurring inputs. Atleast 33 1/3 % of the above cost is expected to be met from the I.I.R.D. finances as subsidy and the rest by the Nationalised Banks in the form of loans. In addition, about Rs. 3.25 lakhs (Institutional finance and subsidy put together) is expected to be invested in the development of traditional riverine fisheries in about 4 blocks of Broach District and about Rs. 3 lakhs are expected to be involved in developing the traditional coastal fishing of Okhamandal, Mangrol and Kutch.

Further to the above, a 22 hectare demonstration farm is also proposed to be constructed in the Rupen Creek of Okhamandal under this programme. This farm is expected to demonstrate the marine fish farming to the local coastal fishermen in order to enable them to undertake marine farming and earn a livelihood.

It is estimated that the implementation of the Intensified Rural Development Programme would provide direct employment to about 2,500 persons and to about 5,000 more indirectly.

Conclusion

As can be seen from the above, the State and the Central development programme have taken into account the potentialities and the manpower available in rural coastal areas of the State and have been striving for the improvement of rural economy through the fisheries sector. The extension activities of the Department, through various effective media, has enabled the beneficiaries in this sector to understand the methodology of organising and developing the rural fisheries. It is heartening that the traditional fishermen have come forward to co-operate in the extensive development programmes of the State.

* * * * * * * * *

PRESENT STATUS OF SMALL-SCALE FISHERIES OF MAHARASHTRA STATE

A.G. KALAWAR

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Maharashtra occupies an important place in the fishing industry of India. It stands second in point of production of marine fish in India giving an estimated annual output of 2.94 lakh tonnes of the total marine fish production of the country which is 13.52 lakh tonnes. Most of the fish production (87%) of the State is contributed by motorised boats. The contribution by non-powered boats is rather insignificant though their number (7,536) is more than double the number of motorised boats (3,007).

Fishing as an industry is fairly ancient in Maharashtra where the existence of a thriving fishing community has been reported in the chronicles as early as 1138 A.D. From time immemorial, these fishermen have been evolving their skill and foresight by long experience handed down from father to son and at present have reached a remarkable stage of ingenuity in operating their nets. They depended on the power of their muscles and their hereditary skill.

STATUS OF SMALL-SCALE FISHERIES DURING THE PRE-PLAN PERIOD

Small-scale fisheries occupied prominent placec during pre-Plan periods. Earlier reports say that fishing methods were highly efficient around Bombay area. The fishermen used very strong and well built traditional boats, known as "Machawa", "Balayao" and "Kota". There are no catamarans in Maharashtra, the smallest boat being a dagout vessel of about half a ton. Fishermen used traditional methods of fishing namely "Bag net" (Dol or Kavi). "Gill net" (Daldi, Budi), "Hooks and Lines", "Bokshi" and "Rampan".

DEVELOPMENT PROGRAMMES FOR THE SECTOR DURING THE PLAN PERIODS

The programme of mechanization of fishing crafts was taken up during the First Plan (1951-56). Before that there were very few boats fitted with engines.

The Government encouraged the fishermen a great deal to take up mechanization. Large incentives were offered to the fishermen so much so that cost of engines were subsidised to the extent of 50 per cent and remaining 50 per cent was offered as loan so that almost 100 per cent of the investment was borne by the Government. This had immediate effect on the fishermen who were convinced about the advantages of the mechanized boats. The advantages were wide cruising range and exploitation of vast areas of the seas, resulting in higher fish catches as compared to non-powered boats. The non-powered boats suffered from the limitation that they depended on wind and tide for their propulsion resulting in a limited cruising range and non-exploitation of vast sea.

Thus, for increasing the marine fish production, the mechanization programme of the Government during the Plan period got a prime place. Since the advent was on introducing something new, the traditional non-powered boats did not receive any incentives and were neglected. However, as a part of development programmes the fishermen engaged in fishing by onon-powered boats also shared the advantages of programmes like loans and subsidy for purchase of nylon and other accessories, etc. with fishermen with mechanized boats.

CURRENT STATUS

The status of small-scale fisheries has remained unchanged through the years. The contribution of small-scale fisheries towards the marine fish production of the State is very small (13%). Thus, it plays a minor role in the welfare of the community. The methods used for fishing operations, the net, the type of boats used for fishing all these have not undergone any change in recent years. As stated earlier the impact of mechanization has been great on small-scale fisheries. As a result, a number of non-mechanized boats are now getting fitted with engines.

A large number of people are engaged in small-scale fishing with non-powered boats. These are fishermen using small sailing vessels and thonies. Their fishing is done near the coast (maximum upto 30 metre depth), the estuaries and the creeks. During off season many of these fishermen are engaged in agricultural labour also. In Ratnagiri District large number of persons are engaged in shore seine (Rampan) fishing. The fishermen fishing in creeks hav creeks have now been faced with the problem of pollution of creek waters. The pollution of creek waters has affected these fishermen especially in Thane creek where several fishermen engaged in creek fishing have given up their profession and sold their boats and equipments. The fishermen engaged in small scale fishing are economically weak and living below the poverty line.

The economic and social uplift of these fishermen should find a prime place in integrated rural development programmes, since almost entire fishermen-population belongs to coastal rural sector.

PROJECTIONS OF THE SIXTH FIVE YEAR PLAN

This sector which has remained neglected so far needs proper attention. Some development schemes which bring their social and economic uplift and thus welfare of the community and fishing industry are necessary.

Although no new Plan schemes have been taken up in the Sixth Five Year Plan for non-powered traditional boats, a new scheme under "small Farmers Development Agency" has been approved by the Government of India. The scheme is applicable to all the coastal taluk s of the State. It has come under implementation in Ratnagiri District recently.

The "SFDA" scheme aims to benefit fishermen residing on the banks of creeks. Such fishermen conduct fishing with limited resources - equipments. Their working conditions are very hard; they have to weed through knee-deep water and make strenuous efforts to catch hand-ful of small fish by means of piece of netting. Most of these fishermen do not have agricultural land also. Therefore, their economic condition is very poor and they can be compared with the landless agricultural labourers. Under this scheme (SFDA) it is proposed to provide such fishermen with a small boat and fishery requisites like twine in order that he may be able to move in deeper water and /or more distances so as to catch sizeable quantity of fish by using a net like Bokshi or Gill net, etc. Hence this scheme envisages to provide him with funds for purchasing the fishing equipments whereby he would earn better income and livelihood.

For availing benefits of the SFDA scheme a marginal fishermann is defined as one deriving an annual income of Rs.3,000/-from fishing alone and having off-fishing income upto Rs.200/-per month. He would be entitled to a subsidy of 33⅓% from [illegible].

A fisherman deriving an annual income of Rs.3,000/- from fishing alone and having off fishing income of Rs.200/- per month and agricultural land upto 2.5 acres only would be indentified as small fisherman and would be entitled for a subsidy of 25% from SFDA. Under the scheme financial assistance of Rs.6,000/- will be given to the beneficiary. Of these Rs.3,000/- are for purchase of small boat of about 3' width and 15'-20' length and Rs.3,000/- for purchase of gear and accessories. Out of Rs.6,000/- capital expenditure a sum of Rs.4,000/- would be loan and Rs.2,000/-subsidy from SFDA.

About 18 beneficiaries have been financed under this scheme in Ratnagiri District. This scheme may bring increased fish production especially during off season when creek catches are high and fetch good price. The above scheme is expected to bring economic uplift to the fishermen engaged in small scale fishing.

SMALL-SCALE FISHERIES

1. Fishery resources

Maharashtra has a coastline extending between latitudes 15°45'N and 20°10'N and 200 metre contour lies at longitudes 72°40'E at the former latitude and 69°28'E at the latter. The coastal strip of Maharashtra lies on a 720 km line. While considering the natural resources of Maharashtra only the continental shelf is considered. However, the area outside the continental shelf also holds enough potential for exploitation. The continental shelf area of the State measures 87,000 sq.km. Thus the State has a vast potential for marine fish production.

The continental shelf is arbitrarily divided into 3 zones, viz, inshore zone (0-17 m), offshore zone (17-75 m) and deep sea zone (100-190 m). The distribution of the continental shelf is given below in Table 1.

TABLE 1 Regionwise Distribution of the Continental shelf

District	Inshore (0-17 m)		Offshore (17-75 m)		Deep Sea (75-190 m)		Total	
	Km^2	%	Km^2	%	Km^2	%	Km^2	%
Thane	1,000	16	13,000	34	14000	33	28,000	32
Greater Bombay	700	11	3,800	10	5500	13	10,000	12
Kulaba	2,000	32	8,000	21	11000	25	21,000	24
Ratnagiri	2,500	41	13,000	35	12500	29	28,000	32
Total Maharashtra	6,200	100	37,800	100	43000	100	87,000	100

At present fishing is restricted to inshore and offshore zones only. It is estimated that only 50% of the continental shelf upto 100 m is being exploited. The State Department of Fisheries and the Government of India surveys have estimated that there exists a harvest potential of 4,61,000 tonnes. Table 2 indicates how the harvest potential is divided over the districts and continental shelf.

Table 2 Fish Potentials of Maharashtra

District	Area 0-70 m depth (Km^2)	Potential (tonnes)	Area 70-200 depth (Km^2)	Potential (tonnes)	Area (0-200 m) depth (Km^2)	Potential (tonnes)
Thane	13,235	95,000	13,220	27,000	26,455	1,22,000
Greater Bombay	5,290	57,000	5,365	11,000	10,655	68,000
Kulaba	10,225	1,54,000	11,195	22,000	21,420	1,76,000
Ratnagiri	14,075	68,000	13,395	27,000	27,470	95,000
Total Maharashtra	42,825	3,74,000	43,175	87,000	86,000	4,61,000

Exploitation (Non-powered boats): As per 1977 census of marine fishermen population, boats and nets, Maharashtra has a fishing fleet of 10,645 boats consisting of 7,538 non-powered boats and 3,107 powered boats. Of the non-powered boats 2,861 are plank built and 4,677 dugout canoes. The non-powered boats in all districts (except Ratnagiri) exploit the areas upto 17 metres depth only because of their limitations in cruising range. In some centres of Ragnagiri District (where non-powered boats are 10-14 metres long) the area of exploitation is upto 30 metres. Table 3 gives the extent of exploitation of fishing grounds by non-powered boats of Maharashtra.

TABLE 3 Exploitation by non-powered maritime boats in Maharashtra

District	Harvest Potential Area 0-17m	Estimated landings by non-powered boats	Percentage of exploitation
Thane	50,808	8,337	16%
Greater Bombay	40,296	9,029	22%
Kulaba	1, 24,976	11,378	9%
Ratnagiri	24,300	*11,785	48%
	2, 40,380	40,529	17%

* Landings upto 17 metre only.

1. It is seen from the above table that exploitation by non-powered boats is very small and it may also appear that the area is not fully exploited. However, as a matter of fact this area is exploited properly since the mechanised boats are also fishing in this area. It may not be wrong to say that the remaining area is exploited by mechanised boats.

2. Production

During pre-Plan period the estimated marine fish production of Maharashtra was roughly 1.49 lakh tonnes. By the end of Fifth Plan the average level of marine fish production rose to 3.61 lakh metric tonnes. This tremendous increase in fish production was due mainly to the impact of mechanisation since the number of mechanised boats increased to 3,107 by the end of

Fifth Plan. The contribution of non-powered boats to marine fish production of the state is small (13%) as compared to that of powered boats.

Table 4 gives yearwise and districtwise break-up of marine fish production in Maharashtra during the Fifth Plan period (1974-75 to 1977-78).

TABLE 4 Districtwise estimated fish production in Maharashtra for the period 1974-75 to 1977-78

(Figures in tonnes)

District	ESTIMATED FISH PRODUCTION				
	1974-75	1975-76	1976-77	1977-78 *	Annual Average
Thane	1,85,467	1,50,712	1,69,054	95,080	1,50,078
Greater Bombay	1,22,188	1,68,522	1,39,394	1,32,585	1,40,672
Kulaba	18,325	36,751	43,784	27,223	31,521
Ratnagiri	38,178	46,027	39,913	32,854	39,243
State Total	3, 64,158	4,02,012	3,92,145	*2,87,742	3,61,514

* Provisional

The marine fish production in Maharashtra crossed the 4 lakh tonne mark in 1975-76 which was an year of abnormal fish production. However, the trend in fish production is a declining one since then.

A further break-up of the annual average marine fish production in quarterly period and by type of boats powered and non-powered is given in Table 5.

As expected the fish production is lowest during the monsoon period. It is at the peak during October-December period followed by a slack period and again a peak in the April-June quarter. The contribution of non-powered boats to the total marine fish production of the State does not exceed 16% in any of the quarters. In Thane and Greater Bombay districts impact of non-powered boats is hardly felt. Mechanized boats are dominant in this region. In Kulaba and Ratnagiri districts non-powered boats contribute significantly to the total marine fish production of those districts.

TABLE 5 Quarterly Average marine fish landings by the powered and non-powered boats during the Vth Five Year Plan period in Maharashtra

(Figures in tonnes)

District	July to Sept			October to December		
	Power	Non power	Total	Power	Non Power	Total
Thane	8,775 (89.03)	1,048 (10.7)	9,823 (100.0)	72,474 (92.9)	5,528 (7.1)	78,002 (100.0)
Greater Bombay	22,311 (91.1)	2,189 (8.9)	24,500 (100.0)	49,578 (93.2)	3,618 (6.8)	53,196 (100.0)
Kulaba	1,827 (58.2)	1,312 (41.8)	3,139 (100.0)	7,036 (71.5)	2,798 (28.5)	9,834 (100.0)
Ratna-giri.	456 (21.9)	1,628 (78.9)	2,084 (100.0)	11,223 (58.7)	7,880 (41.3)	19,103 (100.0)
STATE TOTAL	33,369 (84.4)	6,177 (15.6)	39,546 (100.0)	1,40,311 (87.6)	19,824 (12.4)	1,60,135 (100.0)

Figures in brackets denote percentage to total in each quarter.

Table 5 - continued

January to March			April to June		
Power	Non-power	Total	Power	Non-power	Total
34,263 (96.6)	1,199 (3.4)	35,462 (100.0)	26,229 (97.9)	562 (2.1)	26,791 (100.0)
30,457 (95.1)	1,578 (4.9)	32,035 (100.0)	29,263 (94.7)	1,644 (5.3)	30,907 (100.0)
5,395 (57.5)	3,944 (42.5)	9,389 (100.0)	5,883 (64.2)	3,274 (35.8)	9,151 (100.0)
5,593 (62.1)	3,414 (37.9)	9,007 (100.0)	3,911 (43.2)	5,132 (56.8)	9,043 (100.0)
75,708 (88.1)	10,185 (11.9)	85,893 (100.0)	65,286 (86.0)	10,612 (14.0)	75,898 (100.0)

Table 5 - continued

District	Total		
	Power	Non-power	Total
Thane	1,41,741 (94.4)	8,337 (5.6)	1,50,078 (100.0)
Greater Bombay	1,31,609 (93.6)	9,029 (6.4)	1,40,638 (100.0)
Kulaba	20,141 (63.9)	11,378 (36.1)	31,519 (100.0)
Ratnagiri	21,183 (54.0)	18,054 (46.0)	39,237 (100.0)
STATE TOTAL	3,14,674 (87.1)	46,798 (12.9)	3,61,472 (100.0)

3. Craft and Gear

As stated above, Maharashtra has a fishing fleet of 10,645 boats as per 1977 census. Of these, 7538 crafts are non-powered and 3,107 powered. Fishing is done by both non-powered and powered boats using traditional gear as also the modern methods (like bottom trawl by powered boats only). A districtwise break-up of non-powered crafts in the State is given below in Table 6.

TABLE 6 Districtwise number of non-powered boats in Maharashtra State

District	Non-powered boats (Number)		Total
	Plank built	Dugout	
Thane	388	615	1,003
Greater Bombay	256	932	1,188
Kulaba	769	876	1,645
Ratnagiri	1,448	2,254	3,702
State Total	2,861	4,677	7,538

It is seen that majority of the non-powered boats, 5,347 out of 7,538 are located in Kulaba and Ratnagiri districts.

The non-powered boats used in the State have been of superior quality and efficient for exploitation and have been recommended for use outside the State. These boats are totally seaworthy.

G e a r: The gear employed in catching fish by non-powered boats in inshore water, estuaries, creek and backwater are classified as follows:

1) Fixed nets (Bag nets)
2) Seine nets (shore seine-Rampan)
3) Drift nets
4) Inshore drag nets
5) Cast nets or hand-thrown nets
6) Scoop nets
7) Long lines and
8) Hooks and lines

Some of the nets used in inshore fishing are also used in creeks with the only difference that the dimensions of the nets are smaller.

In Maharashtra both mechanized and non-mechanized boats use the traditional gears like bag net and gill net. The only difference is that the meachanized boats use larger nets and operate in comparatively deeper waters. Trawl net (not mentioned above)is used by mechanized boats only. In case of shore-seine (Rampan) which is operated in southern part of Ratnagiri District, a non-mechanized boat is required for carrying the heavy gear and spreading it in the bay.

Bag net (Dol or Kavi): The bag net (Dol), like a trawl net, is roughly funnel-shaped and is mainly fabricated from monofilament twine. It is a fixed type of net operated at the bottom and can be used where sea currents are appreciable as in the case of Thane and Kulaba Districts. Like trawl net it has a mouth and cod end. Similarly, the mesh size is largest (typical is 22.25 cm) at mouth and smallest (typical is 1.25/2 cm) at cod end. A typical net is 50 metre long. The circumference at the mouth varies from 320 to 550 cm. For setting the nets stakes are firmly embedded and the net is fixed through two stakes by rings, after which the foot and head ropes are kept in position setting the net against

the tide. At the end of the tide the net is emptied and reset in opposite direction. Non-powered crafts operate the gear upto 30 metre depth and usually stay out for collection of the catches. The bag net operation is a unique demonstration of extraordinary skill in traditional gear. The catches mainly comprise Bombay duck (Bombil) and the shrimp Acetes (Javla).

Gill nets: Gill nets are made of nylon both mono as well as multifilament. Formerly cotton twines were used. A piece of webbing is usually 200 metre long and 5.6 m wide. The mesh size varies from 10 cm to 20 cm (stretched). The hanging factor is 50% . Depending upon the area of operation, size and nature of vessel, as many pieces (of such ready type) as needed are joined, with a little width-wise overlapping, so as not to permit any open space between the two pieces. The net can be allowed to drift when it is called "Drift net" (Daldi or Tarati) or fixed at bottom when it is termed as "Bottom set gill net" (Budi).

Fish like Pomfret, Dara, Ghol, Surmai ,etc. are caught by this gear. The catch by this gear, therefore, is qualitatively rich.

Shore seine (Rampan): In the sandy beach areas where big fish shoals approach near the shore at certain seasons a great deal of fishing takes place within 2 kilometres of the shore. It is in these conditions that Rampan net is most successful and often heavy catches are made without much danger or difficulty. The Rampan is the most efficient instrument for the capture of shoaling fishes such as sardines and mackerel that periodically appear in large quantities, in the near shore waters. The Rampan net, used with a non-powered country craft, is made of hemp or cotton twine and is 600-800 metre long. The height of the net increases

towards the middle of the net, while the mesh size decreases from 4 cm to 1 cm. The net is pulled collectively by 40-60 fishermen. These fishermen are known as " Rampan Sangh". The catch mainly consists of mackerel and sardine and sometimes prawnsalso. The shore seine is operated in southern part of Ratnagiri District.

4. Fishing Operations

As stated earlier the number of non-powered boats in Maharashtra is 7,538. Of these 2,861 are plank-built and 4,677 dugout canoes. A composition of these boats in terms of construction and length is given in Table 7. This Table will give a fair idea regarding the scope of operation of these vessels, which is generally restricted to 20-30 metre contour from shore line. Some of the larger non-powered boats are used for operating shore seine, where the vessel size is mainly required for storing and carrying "Rampan". Kulaba and Ratnagiri districts share major part of non-mechanized boats in the State.

The engine power in all cases excepting trawling is used for propulsion rather than operation of gear. As stated earlier both mechanized and non-mechanized boats use traditional gears.

Areas of Operation: For traditional fishing (bag net) the non-powered boats do fishing upto 10-12 fathoms. Boats fishing in creeks (Bokshi) go for 5-7 fathoms. The gill net boats can go farther in different areas. The Rampan operations are done within 2 km of the shore. In season the sailing vessels go in inshore for fishing. During monsoon fishing by non-powered boats is restricted to creeks and estuaries.

The non-powered boats leave in the early hours of morning for fishing depending on tides. After taking at the most 1 or 2 hauls they return to landing centre late in the afternoon. In case of creek fishing hauls are taken at regular intervals of 4 or less hours. Fishing is generally suspended during low tides in case of bag net.

TABLE 7 Distribution of Non Powered Boats by length

District	Plank Bult (No)					Dugout Canoes (No.)					
	Below 4 Metre	4-6 mtr	6-10 mtr	10-18 mtr	Total	Below 4 metre	4-6 mtr	6-10 mtr	10-18 mtr	Total Dugout	Total Non-Powered
Thane	6	112	235	35	388	120	417	78	-	615	1,003
Greater Bombay	1	92	155	8	256	157	668	107	-	932	1,188
Kulaba	-	157	576	36	769	32	485	359	-	876	1,645
Ratnagiri	1	349	904	194	1448	184	1936	134	-	2254	3,702
State Totals	8	710	1870	273	2861	493	3506	678	-	4677	7,438

INFRASTRUCTURE

Landing and Berthing facilities

There are 185 landing centres in the coastal area of four maritime districts of the State. In 69 landing centres (which are minor) only non-powered crafts land and in the remaining 116 landing centres both mechanized as well as non-mechanized crafts land fish. In the State, landing and berthing facilities are inadequate at present due to congestion, tides and rocks , etc. With the exception of Sassoon Docks and Kasara none of the centres can be termed as fishing port. Even in Sassoon Dcoks there is a problem of great congestion-entry and exit of the vessel is subject to tide, inadequate quay and water shortage. Maharashtra with the largest fleet of mechanized vessels has, therefore, no fishing port worth the name.

For providing landing, berthing and navigational facilities at various centres in the four maritime districts of the State, 64 proposals were prepared by the Fisheries Department on priority of work. Priority means intensity of landing and potential. Out of 64 proposals, 35 proposals estimated at Rs.5 crores have been forwarded to the Government for clearance from the Central Government. Five works costing Rs.23.20 lakhs out of these have been cleared by the Central Government for completion during Fifth Five Year Plan.

As regards proposals for major ports, State Government is of the opinion that there should be at least a full-fledged fishing harbour for each of the maritime districts. Accordingly, technical project reports (prepared in close collaboration with Pre-Investment Survey Unit) for expansion of Sassoon Docks

in Greater Bombay District and Construction of a full-fledged fishing port at Mirkarwada in Ratnagiri District have been cleared by the Government of India. Work is in progress at Mirkarwada. Technical report prepared by Pre-Investment Survey Unit, Bangalore, on Agardanda fishing harbour located in Kulaba District has been forwarded to the Government of India. The project envisages a fishing port mainly for the deep sea fishing, with provision for fleet and infrastructure. The project when completed will go a long way in reducing congestion of Sassoon Docks. Exports can also be handled through Dighi, a commercial port opposite Agardanda.

The management of all fishing ports, major and minor-excepting for Sassoon Docks- is done by the Port Department of the State. Sassoon Docks and Kasara are managed by the Bombay Port Trust.

Preservation and processing

Fish being a highly perishable commodity, proper preservation by cold treatment is absolutely necessary before its transport to marketing centres, for its sale in fresh condition or in processed condition. Hence fish is required to be kept in ice for this purpose. A number of ice factories and cold storages have come up both in private and co-operative sector. At the end of 1977 there were 146 ice factories with a capacity of 2,386 tonnes of ice per day and 76 cold storages with a capacity of 45,033 tonnes per day and storage for fish 1,157 tonnes. 18 of these ice factories are in-cooperative sector, 7 in corporate sector and rest 121 in private sector. About 85 ice factories and 54 cold storages are purely for fishery purposes and they are along the coastline from Dahanu in the north (Thane District) and ending with Vengurla in south (Ratnagiri

District). There is scope for establishment of more ice plants and cold storages in the coastal districts. With more port facilities and extension in fishing operation they will come up in due course. The department has already a scheme to financially assist the fisheries co-operative societies which are ready to establish such units. The National Co-operative Development Corporation is also likely to assist financially such units.

Processing units

Quick freezing plants, canning plants and fish meal plants come under this category. At present there are 30 freezing plants. Five are in co-operative sector and the rest 25 are in private sector. The total capacity of these plants is to freeze 210 tonnes of fish a day with a storage capacity of 1975 tonnes.

There are 6 canning plants with one in co-operative sector (District Federation) and five in private sector. T he latter are used for fruit canning also.

There is only one fish meal plant in the co-operative sector (Apex body) with annual capacity of "1000" tons. About 6-7 plants are in private sector for fish manure.

Marketing

Marine fish is consumed in various forms. In the fresh or processed condition it is used for human consumption and through reduction it is used for other purposes. The processed product has an export market. During past few years export of fish has steadily been increasing from Bombay and Ratnagiri the two ports of the State.

Marketing of fish requires proper preservation, processing and quick transport to the marketing centres located at distant places, which requires careful handling.

As per a study team it has been assessed that as much as 97% of marketing of fish is in private hands. In Maharashtra co-operative sector has not made much headway in marketing of fish. (Out of 33.21 crores rupees of fish catch only 2 crores have been marketed through co-operative). Although a few co-operative societies have been individually found excellent so far as marketing is concerned, by and large co-operative sector has yet to reach the desired level of achievement. At Mirkarwada (Ratnagiri) a co-operative society of retailer is operating. Unregistered women's association for sale of dry and fresh fish is also functioning in Bombay. In order to promote sale of fish through co-operatives the Government had formulated integrated fisheries projects at Thane, Kulaba and Ratnagiri which would be involved from the operation of fish catch to its handling, preservation, transport and marketing and export.

The position of fish markets is not satisfactory even in city like Bombay, which is the biggest market, bare necessities like adequate water supply proper drainage, ventilation are wanting at places. Bombay has 5 wholesale major markets including the quays at Sassoon Docks and Kasara Bunder, where fish is auctioned, and 60 corporation authorised retail markets. The city receives fish not only from the adjoining districts of this State but also from outside States like Gujarat in the north and to an extent Karnataka in the south. There are 79 auctioneers and fresh fish merchants at

three wholesale markets in Greater Bombay, excluding Sassoon Docks and Kasara Bunder.

For marketing of dried fish there are quite a number of private parties who have organised themselves into "Dry Fish Merchants' Association" situated at Sewree, Bombay. It has been estimated that the city's annual intake of fish is 1.75 lakh tonnes (1.40 lakh tonnes fresh and 0.35 lakh tonnes dried).

Wholesale transactions on the landing site take place at many landing centres like Dabhol, Ratnagiri, Malwan, Vengurla and Shriwardhan.

The fish received at wholesale markets at Kasara-Bunder and Sassoon Docks is auctioned through auctioneers on commission basis, which is variable from 2 to 6%. Some of the co-operative societies also function as auctioneers. The fish so purchased is sold to retailers. At several places fish caught by a vessel goes straight to retailing through the women folk of the group operating the vessel.

In Thane and Kulaba districts fisheries co-operatives have made arrangements to send their fish for marketing at Bombay through their district federation.

Boat Building

Boats are the backbone of fishing industry. The safety and economy of fishing operations are dependent on the efficiency of the boats. The traditional boats of Maharashtra are totally seaworthy. The non-powered boats are plank built and dugout canoes. As a matter of fact the entire fishing fleet of the State is of wooden hulls. Some steel trawlers are built in Mazgaon Docks.

Boat building facilities are avilable throughout the entire coastline of the State. The wooden hull construction is undertaken all along the coastline at various centres like Dahanu, Satpati, Bassein, Versova, Alibag, Ratnagiri and Deogad. There are some 7-10 registered boat building yards in the State. Boat building at majority of the landing centres is an unorganised industry in the State in the sense that fishermen generally call the carpenters at their places and get the hull constructed as per their requirements. Some private firms take construction upto 17 metres overall length though majority of the boats are in 12-14 metre range. The capacity of boat building yards in private sector is 10 wooden hulls each at a time- the work taking 4 months for completion.

Generally, the experts form themselves into groups and construct hulls to any given design. It has been found that construction of a vessel to a given design costs more than construction of a traditional vessel, hull of which is capable of being mechanized. The hulls are made of seasoned teakwood when timber is cheap. In view of rising prices of timber, a tendency has developed to construct underwater part of a vessel with seasoned teakwood, the superstructure being constructed with less costly boat building material. A plank built boat, on an average, costs Rs.7,000/-, a dugout canoe costs Rs.3,000/-. A 14 metre OAL wooden hull costs Rs.90,000/-. With the costs of engine and accessories and gear added, the capital cost at current prices comes to about Rs.2.50 lakhs.

Gear fabrication

Gear fabrication has come in practice very recently in the State. There is one recognised factory for gear fabrication at Ahmednagar. One more is

functioning near Alibag in Kulaba District. Fishermen all over the State make and repair their own nets during off season. There is at present no great demand for fabricated nets as fishermen prefer to use their own nets. However, such nets can be useful for fishermen who lose their nets through accidents or strong sea currents (surface gill nets,etc). Such fishermen will find readymade nets useful.

At present about 3,550 persons are engaged in net making and net reparing in the four maritime districts of the State.

SOCIO ECONOMICS

As per 1977 census, there are 375 fishing villages/ hamlets in the four maritime districts of the State. There are 38,178 fishermen households with a total fishermen population of about 2,24,040. Totally 1,20,273 workers are engaged in marine fisheries (Table 8); this is less than 1% of the population of marine districts.

TABLE 8 WORKERS ENGAGED IN FISHERIES (1977)

Active fishermen	..	42,237
Workers engaged in drying/ curing		21,182
Workers engaged in marketing		31,841
Workers engaged in net making		3,543
Others		1,608

The literacy rate in marine districts is more or less the same as the all Maharashtra rate (392).

The religions prevailing under the fishermen are Hindu, Christian and Muslim. The Khar, Machis and Bhois are the principal fishermen communities in Maharashtra.

Fishermen engaged in Small Scale fishing

Although it is difficult to give break-up of population into those engaged in fishing with powered and those with non-powered boats, it is roughly estimated that about 58,300 persons are in the non-powered sector. Of these 9,951 persons are active fishermen i.e. engaged in fish catch by non-powered boats. 9,036 (i.e. 91%) out of 9,951 active fishermen are engaged in fishing by plank built boats and the rest 915 (10%) by dugout canoes.

A districtwise breakup of fishermen population as per 1977 census is giwein Table 9.

TABLE 9 Fishermen population in Maritime Districts of Maharashtra State as per 1977 Census

District	Fishing villages	FISHERMEN POPULATION				Total
		Powered Boats		Non-powered		
		Total population	*Active Fishermen	Total population	Active fishermen	
Thane	82	58,057	10,783	13,072	1,733	71,129:12,5
Greater Bombay	23	34,172	3,996	1,299	136	35,471: 4,13
Kulaba	102	36 ,487	8,940	15,320	2,540	51,807:11,48
Ratnagiri	108	37,027	8,567	28,606	5,542	65,633:14,10
Total	375	165,743	32,286	58,297	9,951	224,040:42,23

* Some non-powered boats active fishermen are included in this.

Ownership of boats

The non-powered boats are owned by individual

fishermen only. He hires crew for fishing. In certain areas like Vasai (in Thane District) fishing is done on non-powered boats by a group of fishermen (6 to 7 in number). These fishermen own their nets but fishing operations are done jointly and the total catch of fish is shared equally by them. One or two more shares are given to boat owner. In Ratnagiri District the non-powered boats used in shore seine are owned by the Rampan Sangh (Group) with membership 50 to 100.

Employment

In non-powered boats the crew employed by the owners (proprietor) is quite small (3 to 4) as compared to crew employed in mechanized boats (7 persons on an average).

In centres where fishing operations are done on partnership basis (like Vasai) by a group of persons the crew strength is 6 to 7 in non-powered (sailing) vessels.

Fishermen's Income

Fishermen's income vary from district to district and is totally dependent on the type of fishing operations. Thus a non-powered boat owner at Shriwardhan engaged in bag net fishing may get annually Rs.5,300/- (gross income) whereas the boat owner from mixed fishing gets roughly Rs.12,000/- (gross income). Since statistics of boat owner's income are not available, no general conclusions can be drawn about the income of fishermen community in general engaged in non-powered fishing. Some of these fishermen are engaged in subsidiary occupations like salt curing, sun-drying of fish, net making, and marketing of fish.

Social conditions

The entire coastal rural sector with the exception

of parts of Thane and Greater Bombay districts is economically backward region. The region has poor Agriculture. It is industrially backward since there is no adequate development of transport and power. The conditions of living of fishermen owning non-powered boats are influenced, thus, by the area in which they live. Their living conditions are deplorable because of great incidence of poverty and subsequently indebtedness. They are living in poor housing conditions With almost no basic amenities like water supply. Greater part of their income is spent on subsistence. Wide spread unemployment has caused a great migration to urban areas. On the basis of a survey to study socio-economic conditions of fishermen in Thane District (1968) it is generally concluded that fishermen community is economically weak. There are households who are much below the poverty line and do not have fishing gear with them.

Development Plans

The objectives of the development of fisheries in the State have been to increase the fish production and the socio-economic upliftment of the fishermen who form the mainstay of the industry. Till the end of the Fourth Five Year Plan, development of fisheries has been more or less as cottage industry. However, with the beginning of the Fifth Five Year Plan, it is assuming an industrial outlook, playing a major role in earning substantial foreign exchange. Keeping this wider outlook of fisheries development an outlay of Rs.5.50 crores has been made in the State's Fifth Five Year Plan.

Marine Fisheries

Mechanization of fishing crafts was introduced in the first plan, in 1951-52, to augment the marine fish production in the State. Being aware that operation of

mechanized vessels required proper training to the fisher - youths in navigation, working knowledge, maintenance and repairs of the marine diesel engine, fabrication and operation of gear, training centres were simultaneously established for the purpose and a vessel was attached to the training centre to demonstrate fishing operations. Scheme to subsidise costly raw material like nylon, so as to have more effective gear without overburdening the fishermen, was also introduced in 1959. As a result of these schemes viz. mechanisation of fishing craft, training centres and subsidy on fishery requisites, coupled with the fishery survey undertaken from 1962 to 1977, the marine fish production in this State has shown a steady rise in level of production.

Inland fisheries

Inland fisheries production in this State was 17,500 tonnes by end of Fourth Five Year Plan. It now stands at 23,500 tonnes by end of 1977-78. The base scheme for development of inland fisheries is the "Fish Seed production project" under which fish farms/units are established at suitable sites in the State, where very badly needed quality fish seed is produced through induced spawning experiments. Other resources like wet bund and dry bund are also explored to augment to fish seed supply. At present, four fish seed units and seventeen fish seed farms are functional. Seventeen fish seed farms are under construction. Annual level of spawn production is raised from 5.45 crores in 1973-74 to 10.13 crores in 1977-78.

Another important inland scheme is "Fish Farming in impounded waters". Under this scheme carp fry imported from West Bengal and locally produced is supplied to the pisciculturists in the State to enable them to stock suitable water sheets every year. The

fishermen and their co-operatives are eligible for subsidy at 25 to 33% on the cost of carp fry. Similarly, suitable reservoirs are stocked. As a result of the proposed development it is expected that inland fish production will exceed 24,000 tonnes by the end of 1978-79.

. Infrastructure

Ice Plants, Cold storages

Since fish is a comparatively more perishable commodity it needs proper preservation for which purpose, prior to its sale either in fresh condition to distant markets or in a processed condition, it is required to be kept in ice. There is much scope for establishment of more ice plants and cold storages in the coastal districts of the State. The department has already a scheme to financially assist the fisheries co-operative societies in the form of Special Redeemable Share capital and loan for establishment of ice and cold storage plants and purchase of transport trucks. The local bodies are also helped financially for construction of fish markets.

Harbour facilities

With the introduction of the mechanized fishing vessels in the State necessity of the proper landing and berthing facilities at the fishing ports was felt. A scheme for improvement of landing and berthing facilities at the minor fishing ports was, therefore, introduced in the second Five Year Plan. The works such as construction of jetties, erection of guide lights, removal of rocks from navigational channel etc. are being carried out under this scheme. It is also proposed to develop the important fishing ports into fullfledged fishing harbours under this Scheme.

This is a centrally sponsored scheme and 100% assistance is made available by the Government of India.

So far 36 works such as providing guide lights, removal of rocks, construction of jetties etc. have been completed at various fishing ports on the coast of Maharashtra. Work regarding construction of full-fledged fishing harbour at Mirkarwada in Ratnagiri District at a cost of Rs.344.25 lakhs and expansion of fishing harbour at Sassoon Dock, Bombay, at a cost of Rs.405.72 lakhs have been started, former is being carried out by the Port Department of the State Government and the latter by the Bombay Port Trust.

In addition to the aforesaid facilities provided under the centrally sponsored scheme, the State Government has also provided facilities, such as construction of fish drying platforms, construction of open sheds, construction of rubble land-cum-approach roads, removal of rocks, erection of guide lights etc. at 77 landing places in the State.

Education and Training

Under the scheme "Training of fisheryouths" eligible youths who have already completed the preliminary training at the departmental training centres in this State are deputed outside the State to receive further training in both marine and inland fisheries at the Central Government run Institutes like the Central Institute of Fisheries Nautical Engineering and Training, Cochin, and Regional (Inland) Training Centre at Hyderabad and Agra. Under another scheme "Training of staff in country and abroad" two departmental officers are deputed for training every year at the Central Institute of Fisheries Education, Bombay.

Co-operative societies

Apart from the above schemes, a scheme to strengthen the fisheries co-operative societies is

implemented by the Co-operative Department. The fisheries co-operative structure in the State is a three-tier system. The basal is primary society with apex society (State level) at the top, the intermediate tier being the district or regional co-operative bodies. The co-operatives are assisted financially and technically by the state co-operative and fisheries departments. Training facilities in respective fields are also provided by the concerned departments. Quite a number of societies from primary to apex have taken to supply of fishery requisities and marketing of fish. Some societies own preservation and transport units. A couple of societies in Greater Bombay are purely engaged in transport activity. The only societies which have also taken fish production are the District Federations in Thane, Kulaba and Ratnagiri Districts, implementing the integrated projects. The fisheries co-operative societies in Thane and Kulaba districts have arrangements to send their fish for marketing at Bombay through their district federations. Although a few societies have been, individually, found excellent, by and large the co-operative sector has yet much scope for improvement.

General Sector Scheme

In order to give more scope to the fishermen for accelerating fish production in inland waters a novel scheme, namely " Fish Farmers Development Agency" is initiated in Bhandra District during 1977-78 at a total cost of Rs.9.33 lakhs with the assistance from Government of India. Similar scheme for Chandrapur District is initiated during 1978-79 at a cost of Rs.7.98 lakhs.

Corporation

Maharashtra Fisheries Development Corporation is established in February 1973 and commercial projects

of the Fisheries Department were transferred to it. These projects have subsequently been transferred to the State agencies or co-operative agencies and the corporation is now planning to promote new schemes pertaining to marine and inland fisheries such as collaboration project of deep sea fishing, integrated fisheries project, supply of carp fry to fishermen by importing it from West Bengal, etc.

Proposed Five Year Plan Programme 1978-83

Fisheries Five Year Plan 1978-83 has now been drawn with an outlay of Rs.720.98 lakhs. It is proposed to introduce about 368 mechanized boats during the period of this plan expecting an increase in fish production of about 20,000 metric tonnes per annum. It is also proposed to take up new schemes to utilise brackish water areas for fish farming by setting up pilot brackish water farms and by assisting the fish farmers and their co-operatives financially and technically in establishing such farms. To take care of additional fish production, 13 ice factories are proposed to be set up in co-operative sector by extending financial assistance to them. They will also be helped financially to purchase 50 trucks during this plan period. Local bodies will also be continued to be assisted for construction of fish markets. It is proposed to take up marketing of fish in the cooperative sector on a substantial scale by assisting the co-operative financially. The Maharashtra Fisheries Development Corporation which is planning to expand its activities will also be assisted financially for undertaking deep sea fishing project. At present, two fish Farmers Development Agencies, one in Bhandra and other in Chandrapur districts are being implemented with the Government of India's assistance. It is proposed to take up one such agency in State sector.

. Credit facilities and Mechanism of Operation

Financial assistance in the form of loans and subsidies for all items pertaining to development of fisheries and particularly the following are given-

(1) Purchase of yarn, twine or net,
(2) construction of and repairs to fishing vessel and fish carrier launches,
(3) purchase of repairs to engines,
(4) purchase of motor trucks,
(5) erection of ice and cold storage plants,
(6) Manufacture of yarn and twine,
(7) purchase of stakes, hooks, lines etc.
(8) establishment of ancillary industries.

Mechanism of operations

The proposals for financial assistance are received from the District Fisheries Development Officers after completing all formalities. The proposals are submitted to the Regional Fisheries Development Officer when the clearance certificates are received from the concerned Deputy Registrar of Co-operative Societies and concerned District Central Co-operative Bank.

For the purpose of financial assistance clear, Comprehensive rules and regulations have been formed under State Aid to Fisheries Rules, 1962

The assistance under the mechanization scheme is sanctioned to enable the groups of members of a society to conduct and operate mechanized fishing vessels. The utilisation of the amount is verified by the District Fisheries Development Officers before it is released.

In case of fishing boats, decks, cabin, fish-holds, financial assistance is sanctioned and its payment is allowed to be made through the District Central

Co-operative Bank to the society only on the basis of recommendation is made by the District Fisheries Dev[illegible] Officer for sanction.

The amount of assistance for engine, winch, gallows and shackles, fuel and water tanks is deposited with the District Central Co-operative Bank concerned for making payment to the supplier after ensuring the physical delivery of these items to the society concerned. Thus, the assistance is verified before it is made available to the society.

The District Fisheries Development Officers and Assistant Superintendents of Fisheries see to it that the actual utilisation of the assistance for the purpose for which it was sanctioned is verified.

The amounts are drawn and disbursed by the District Fisheries Development Officers concerned after sanction is received from the Director of Fisheries/Government.

Interest

The rate of interest on loans for development of fisheries shall be 4½% per annum simple interest provided the mortgaged assets are insured. A rate of 7½% per annum simple interest shall be charged if the assets are not insured.

Period of repayment of loans

The period of repayment of loans does not ordinarily exceed seven years, except in the case of indigenous engines where the repayment period does not exceed 15 years. The period of repayment is mentioned in the loan agreement.

Financial assistance from NCDC for Development of Fisheries

For accelerating the development of fisheries co-operatives for the uplift of the fishermen in the

State the Maharashtra Government has accepted the National Co-operative Development Corporation's pattern of financial assistance.

According to this pattern, assistance will be given to the co-operatives in the form of share capital for marketing, supply and distribution activities, purchase of mechanised fishing boats and transport trucks, establishment of ice plants, cold storages, fish meal plant, service stations, net making plants, construction of godowns/sheds, development of fish tanks etc.

Under the pattern 80 percent of the project cost would be available to the State Government from the NCDC in the shape of loan and subsidy which is (20 per cent) by way of reimbursement, the remaining 20 per cent being , borne by the State Government as subsidy.

Under the scheme 100% financial assistance for construction of a mechanized boat is available to groups of fishermen sponsored by the fisheries co-operative societies and to the sponsoring fisheries co-operative societies. (This group should not have availed previous financial benefit by way of subsidy/ Special Redeemable Share Capital in the past under the scheme " Mechanisation of fishing craft"). 20% of the cost will be granted as subsidy to be reimbursed by NCDC. Amount equal to 25% of the cost of the mechanized boat will be granted as share capital to the sponsoring society which it will invest in the mechanized boat of the fishermen group. Out of this 20% of the share capital is to the society which it should advance to the fishermen group as loan to be recovered in 12 years. The State Government will grant loan to the fishermen

group and society and will get the amount reimbursed to the extent of 60% from the NCDC. The entire finance will be routed through the Department of Fisheries, Government of Maharashtra. The amount will be repayable in twelve years in equal monthly instalments. The effective rate of interest charged by NCDC for timely repayment of principal and interest was 9½% and normal rate of interest on loan was 12½% in the year 1975-76. The State Government would charge ½% more.

Application for assistance will have to be submitted by the group sponsored by co-operative society. This will be sent to the District Fisheries Development Officer who, after scrutiny, will send it to the Regional Fisheries Development Officer, The Regional Fisheries Development Officer, with recommendation, will submit the same to the Director of Fisheries, who, in turn, will forward the project to Government in Agriculture and co-operation Department for getting the clearance from NCDC. After getting clearance from NCDC the group will go ahead with boat construction work.

This is regarding the medium term and long term loans. But the fishermen also require short term loans every year for repairs to boat, engine and for purchase of nets etc. before the fishing season commences. This short term loan, or the production loan as it is called, is provided by the co-operative banks. The District Central Co-operative Bank advances short term loan to the primary co-operative societies of fishermen taking into consideration the actual requirements of the members of the society and their performance in the past, This loan is to be repaid within 11 months.

Conflicts, if any, between traditional and mechanized fishing operations

One of the unfortunate results of mechanization is the beginning of conflicts between mechanized boat owners (the trawlers) and the traditional fishermen engaged in gill netting, shore seine operations in Ratnagiri District, especially southern part-Malwan and Vengurla. Many times the clashes have taken place between the mechanized boat operators and traditional boat owners. The Government is making all the efforts to end their disputes. The sea off some centres such as Vengurla, Deogad in Ratnagiri District has some rich prawn fishing grounds-especially the white, kanshi and powalan varieties. Naturally, a large number of trawlers assemble there for prawn fishing in this area. It is not Vengurla area alone but in other centres like Dabhol, Harnai, Ratnagiri, Deogad and Malvan also large number of trawlers congregate for fishing. In fact, the trawlers migrate from one place to another when prawn catches are abundant in the area.

The Rampan season generally commences in August and is in full swing till December. Other traditional fishing along with Rampan continues till the end of season. Trawling generally starts from end of November.

Generally, 100 to 120 mechanized trawlers from all over the district operate from such ports where prawn concentration is more. In such cases, the local fishermen complain against the trawler operators. The local fishermen's main contention has been that the mechanized boats operate in shallower waters and hence small fishermen who were engaged in traditional fishing (gill nets, hooks and lines) do not get fish. Their nets also get damaged by the trawlers. They also complain that their catch bring low returns since the volume of catch by mechanized boats is more.

Taking into consideration the situation at such ports, the State Government appointed Bunder Samiti (Port Committee) under the chairmanship of the Deputy Collector, Vengurla. The District Fisheries Development Officer, Ratnagiri, was the Member-Secretary of this Bunder Samiti. One representative each of the trawler operators and local fishermen was also taken into the committee. Such committees try to solve the problem of fishermen by regulating the fishing operations of mechanized and traditional non-powered boats by prescribing code of conduct.

At present, there is no legal provision to restrict the operational limits for the different types of boats. The Government of India has issued some directives or guidelines regarding delimitations of the fishing zones for different types of fishing boats. As per this, the mechanized trawlers may have to operate beyond 5 km line.

- Maharashtra Fisheries Act, 1960

  The Maharashtra Fisheries Act enacted in January, 1961 provides for the protection, conservation and development of fisheries in the State of Maharashtra.

This Act is called "The Maharashtra Fisheries Act, 1960". It extends to the whole of the State of Maharashtra. The main object of this legislation is to enable the State Government to take suitable action for conservation of fisheries resources in case they show any sign of depletion.

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APPENDIX TO PAPER BY SHRI A.G.KALAWAR
DIRECTOR OF FISHERIES, MAHARASHTRA.

A NOTE ON SOCIO-ECONOMIC SURVEY OF THANE DISTRICT, 1968

1) A sample survey to study the socio-economic conditions of Fishermen community in Thane District, was conducted in the months July, August, 1968. Such surveys help to ascertain the Socio-economic indications of the conditions prevailing and effect of developmental schemes on the socio-economic conditions by Surveys at intervals.

2) The main characteristics of demographic conditions studied were the average size of the household, sex ratio, distribution of the population by age, marital status, educational status. The main characteristics of the economic conditions surveyed were employment pattern, economic status, indebtedness, average value of capital assets at current market prices and land owned, possessed and cultivated. With household as a unit information was collected on these characteristics.

3) Sampling design:- The villages were grouped in three classes as shown below:-

i)	Villages with No.of households	above	200
ii)	-do-	between	101 to 200
iii)	-do-		100 or below.

The villages were arranged within a class in an order north to south and noting list of households of Departmental census, 1965. 3% of the total No.of households listed in the Census, 1965 viz., 216 were selected circular systematically over all the three classes. As a result, households were selected in 40

..2..

fishing villages out of 42 in Thane District, number ranging from 1 to 26 according to the density and 2 villages being thinly populated, no household was selected. List of villages by classes is given in Appendix :A

4) Definitions:- The definitions adopted have been summarised below:

4.1 Household:- A group of persons who usually live together under the same roof and take their meals from a common kitchen constituted a household.

4.2 Fisherman household:- A household in which at at least one person was engaged in active fishing or the allied occupations, viz., drying, curing, fish marketing, net making, or other related occupations was treated as a fisherman's household.

4.3 Gainful employment:- A person who was paid in cash for both for his services or production was treated or kind as gainfully employed.

5. Average household size:- The total number of persons in 216 sample households surveyed was 1558. The Average household size worked out at 7.21 as compared to 6.49 as per census 1969 and 6.52 as per census 1965.

6. Sex Composition:

TABLE NO.1

Percentage distribution of persons by Sex

Sex	Percentage
Males	50.1
Females	49.9
Total	100.0

Sex-wise distribution shows that the population was evenly distributed. The no. of females per 1000 malesworked out at 997.

7. Age Composition:- The age group 15 to 59 (Forming the Labour force) consisted 50% of the persons.

*4.4 Capital assets:- Fishery requisites of a nature of duration of one year or more were treated capital assets.

TABLE NO.2

Percentage distribution of persons by age groups

Age Groups	Percentage
0-6	21
7-14	24
15-17	7
18-30	20
31-44	14
45-59	9
above 60	5
Total	100

8. Education:

8.1 The percentage of illiteracy was 54.

TABLE NO.3

Percentage distribution by educational status and by Sex

Educational	Percentage		
	Males	Females	Total
1. Illiterate	40	67	54
2. Literate but below primary	7	3	5
3. Primary	25	19	21
4. Middle	26	10	18
5. S.S.C.&above.	2	1	2
Total..	100	100	100

Percentage of illiteracy in females was higher than in males, at 67% against 40%.

8.2 The distribution of persons by age and educational status is shown in Table No.4. The higher educational levels were observed for age group 18-30. The development

seems to have taken place in last decade. The distribution by sex is shown in Appendix-B.

8.3 Information was also collected whether children below 18 years were attending School. The percentage distribution by sex is shown in Table No.5. The percentage of female children not attending school in the schooling age group 6 years to 17 years was higher than that of male children at 35% as against 10%.

TABLE NO.4

Distribution of persons by educational status and age

Age groups	Illiterate	Literate below primary	Primary	Middle	S.S.C. and above	Total
0-6	324	-	-	-	-	324
7-14	69	12	198	96	-	375
15-17	21	6	21	65	-	113
18-30	137	19	40	82	20	307
31-44	125	24	42	22	4	217
45-59	95	17	17	15	-	144
60& above	69	6	3	-	-	78
Total...	840	84	330	280	24	1,558

TABLE NO.5

Percentage distribution of Children attending school by sex

Item	Percentage		
	Male	Female	Total
1. Attending School.	90	65	77
2. Not attendingSchool	10	35	23
Total	100	100	100

9. The information as the attitude of the parents/ guardians to the male children taking up fishery.

TABLE NO.6

Percentage distribution by preference to fishery training

Preference to Fishery Training	Percentage
1. Exclusively fishery work	20
2. Fishery work but will take to any alternative occupation if better	43
3. Not any fishery work	20
4. Not definite	17
Total	100

Of the boys under 18 years of age which constituted 52% of the male population, that 20% of them do notwant to take up the hereditary occupation, is an alarming situation.

10. Compostion by Marital Status:- The distribution of persons by age and by sex is shown in Appendix-C. The child marriage system has definitely extinguished; an impact of education and urbanisation.

11. Principle industry:

11.1 Information was collected on the nature of economic activity of the gainfully employed person. The activity was classified as industry occupation. While industry is the branch of economic activity in which the person works in producing either goods or services, occupation is the trade profession or type of work performed by him. The industry groups are: 1) Fishery, 2) Agriculture, Livestock, Forest and Hunting 3) Mining, 4) Manufacturing, 5) Construction, 6) Transport, 7) Trade and Commerce, 8) Services. Although Fishery forms part of "Agriculture, Live-stock, Forest and Hunting", as one of primary production, the survey being only for Fishery Community (by activity), ... treated as a separate "Industry" group.

TABLE NO.8

Percentage distribution of the households by subsidiary industry.

S.No.	Industry	Percentage
1.	Agriculture, Livestock, Forestry & Hunting	79
2.	Manufacturing	6
3.	Construction	-
4.	Trade & Commerce	2
5.	Services	13
	Total	100
No.of households	48	

11.4. 23% of the households have agriculture principal of subsidiary industry.

12. Land owned, possessed and cultivated:

12.1 Land owned is judged by heritable right of occupancy. Land possessed is land owned plus land leased in minus land leased out. The reference period for land cultivated was 1967-68.

TABLE NO.9

Percentage distribution of the households by land owned, possessed and cultivated.

Area ranges (Acres)	Percentage of Households		
	Land owned	Land possessed	Land cultivated
0 - 0.99	4.2	3.2	77.3
0.00 - 0.99	88.3	83.9	9.7
1.00 - 1.99	6.9	6.9	8.3
2.00 - 2.99	2.8	3.2	1.8
3.00 - 3.99	0.9	1.4	1.4
4.00 - 4.99	0.5	-	0.5
5.00 - 9.99	0.5	0.9	0.5
above 10.00	0.9	0.5	0.5

TABLE NO.9

Percentage distribution of the households by land owned, possessed and cultivated.

Area range (Acres)	Percentage of Households		
	Land owned	Land possessed	Land cultivated
0 - 0.09	4.2	3.2	77.3
0.10 - 0.99	83.3	83.9	9.7
1.00 - 1.99	6.9	6.9	8.3
2.00 - 2.99	2.8	3.2	1.8
3.00 - 3.99	0.9	1.4	1.4
4.00 - 4.99	0.5	-	0.5
5.00 - 9.99	0.5	0.9	0.5
above - 10.00	0.9	0.5	0.5
Total	100.0	100.0	100.0

12.2 Out of 84% of cases of land owned and/or possessed in the range 0 acres to 0.99 acres, 77% are cases of house-sites. 23% households have land cultivated.

13. Income :

13.1 Income to the household was classified as income from gainful activities and income from non-gainful activities. Income from gainful activities is remmuneration or receipt from production of goods and services. Income from non-gainful activities are rents from buildings, land, boat etc. interest receipts, dividond etc.

TABLE No.10

Percentage distribution of the households by income

Income ranges	Percentage of Households by income from		Total income
	Gainful activity	Non-gainful activity	
0-499	-	71.5	-
500-999	5.6	11.3	5.6
1000-1499	11.1	7.1	11.1
1500-1999	20.4	7.1	19.9
2000-2999	24.0	-	21.5
3000-3999	14.7	-	14.3
4000-4999	6.9	-	6.5
5000-5999	6.5	-	7.3
6000-6999	4.2	-	4.2
7000-7999	1.9	-	1.9
8000-8999	0.5	-	0.5
9000-9999	2.3	-	2.3
Above 10000	1.9	-	1.9
Total ..	100.0	100.0	100.0

13.2 Nearly 59% of the households have income in the range of Rs.15 000 to Rs.1,000.

14. Employment :

14.1 Nearly 42% of the persons were gainfully employed. The distribution of the gainfully employed persons was also even; males were 51% and females 49%.

TABLE NO.11

Percentage distribution of the gainfully employed persons by Sex.

Sex	Percentage
Male	51,3
Females	48.7
Total	100.0
Gainfully employed persons Total ... Persons	667 / 1,558

14.2 Employment status is the capacity in which the gainfully employed person works, and was classified as employee, employer, own account worker, working group system or unpaid family enterprise worker.

TABLE NO.12

Percentage distribution of gainfully employed workers by employment status in galaried occupations or occupations in household enterprise

Salaried occupation	Occupation in household enterprise employment status					
	No.Household enterprise	Employer	Own account worker	Working in group system	Unpaid family enterprise worker	Tot
No salaried Occupation	-	0.1	13.5	19.3	43.7	76.6
Employee	13.1	-	5.0	0.4	4.9	23.4
Total ..	13.1	0.1	18.5	19.7	48.6	100.0

The worker was classified by employment status according to his occupation (trade, profession or type of work) in household enterprise or salaried occupation.

or 14.3 Employee was one who fetched remuneration cash/kind for goods or servicesproduced. Employer

was one who engages hired persons for his enterprise. Own account worker who worked without hiring worker but might be assisted by the family worker. A person working in group system was a worker in joint enterprise. An unpaid family enterprise worker was one who assisted in family enterprise but did not get remuneration for the work.

14.4 77% workers were engaged in occupations in household enterprise, 23% workers were engaged in salaried occupation, out of which 10% workers were also engaged in occupations in household enterprises. 49% workers were working in the capacity of unpaid family enterprise workers. 29% workers were engaged in Joint enterprises.

TABLE NO.13

Percentage distribution of gainfully employed persons by sex and by industry.

Industries	Salaried Occupations			Occupations in household enterprises		
	Males	Females	Total	Males	Females	Total.
1. Fishery	56.9	51.9	55.3	81.8	92.9	87.4
2. Agriculture Livestock, Forestry & Hunting	15.5	42.3	23.8	15.0	6.1	10.5
3. Manufac-turing	3.5	-	2.4	2.2	0.7	1.3
4. Construction	4.3	-	3.0	-	-	-
5. Trade& Commerce	2.6	-	1.8	1.0	0.7	0.8
6. Services	17.2	5.8	13.7	-	-	-
Total ...	100.0	100.0	100.0	100.0	100.0	100.0

14.5 Of the persons engaged in salaried occupations 55% persons were engaged in Fishery and 24% persons were engaged in Agriculture. Of the

..12..

persons engaged in occupations in household enterprises 87% were engaged in Fishery and 10% in Agriculture. Females engaged in salaried occupations in agriculture were 42% as against females engaged in occupations in agriculture as household enterprise were 6%.

14.6 Table No.14 shows the percentage distribution of gainfully employed persons by income ranges. In this classification unpaid family enterprise workers were excluded as the income of the household from the enterprise was shown against the own account worker in the household.

TABLE NO.14

Percentage distribution of the gainfully employed workers by income ranges.

Income Ranges	Persons engaged in salaried occupation	Persons engaged in occupations in household enterprises	All persons
0-499	42.3	15.6	18.5
500-999	22.0	15.6	12.0
1000-1499	14.3	12.3	14.2
1500-1999	10.1	14.1	16.6
2000-2999	7.7	19.9	18.5
3000-3999	2.4	13.7	12.3
4000-4999	1.2	4.4	3.5
Above 5000	-	4.4	4.4
Total	100.0	100.0	100.0

14.7 64% of the persons engaged in salaried occupations had income/in the range/Rs.1500 to Rs.4000. /less than Rs.1,000 and 20% income 48% of the persons engaged in occupations in household enterprises had income in the range Rs.1,500 to 4,000. Over all 48% of the persons had income in the range Rs.1500 to Rs.4000.

Economic Status:

14.8 The gainfully employed persons were further classified as earners and earning dependents; earner being one who earns sufficient to maintain oneself and earning dependent being one who earns but is not sufficient to maintain oneself. 20% of the total persons were earners whereas 57% were non-earning dependents.

TABLE NO.15

Percentage distribution of the persons by sex&by economic status.

Economic Status	Percentage		
	Males	Females	Total
1. Earners	38	2	20
2. Earning dependents	6	40	23
3. Non earning dependents	56	58	57
Total	100	100	100

15. Capital Assets:

15.1 Information was collected on the capital assets duration more than one year) possessed by the households. It was observed that the capital assets were not possessed by all the households. Various practices were observed. Capital assets were owned either proprietory or in partnership. Some households possessed hull, engine and gears proprietory or in partnership, yet some possessed gears without possessing boat or engines, practice in such cases being to operate the fishery in group and an additional share of the catch is given to the owner of the boat.

TABLE NO.16

Percentage distribution of the household by assets and fishery

Fishery	Percentage Possessing Assets hull	engine	Without possessing assets	Total
Major gears	22.7	16.7	17.6	57.0
Minor gears	-	-	13.9	13.9
No gears	-	-	29.1	29.1
Total:	x	x	x	100.0

15.2 57% households possessed major gears (bag-net and gillnet fishery), out of which 18% did not possess other boat or engine. Nearly 14% possessed minor Gears such as Wedhi, Gholwa, pag (cast net) etc. 29% of the households did not possess gears. Gainfully employed persons from these households worked as active fishermen or in sorting or in drying of fish and/or agricultural labour, in the capacity of employee.

15.3 Information was collected on the replacement value of the capital assets possessed by the households. Replacement value was taken as the current market price (1968) for a new item of similar make or type. The average replacement value of the capital assets is shown in Table No.17.

TABLE NO.17

Average Value of Capital Assets.

Item	Unit	Average Value Proprietory No.	Proprietory Value(Rs)	Partnership No	Partnership Value(Rs)	Value not reported for Unit/ Household
Boat						
Mechanised	No	10	16,500	29	3,943	3
Sail	"	-	-	3	5,167	3
Tony	"	12	931	1	250	2

Table No.17 (contd)

Tony	Engine	No	2	30,717	21	5,691	60
Gear	House hold		122	2,444	37	2,129	7

15.4 The average tonnage of mechanised/sail boat for which replacement price was quoted was 9 tonnes and that of tony was 0.73 tonnes. The high number of 'not reported' cases of engines were the imported engines, imports of which were stopped in 1968, and replacement value was not available.

16. Consumer Expenditure:

16.1 Information on consumer expenditure of the household was collected for a period of 30 days proceeding the date of enquiry. The data relates to household consumption for non-productive domestic purposes. The per capita expenditure on food and non-food items is shown in Table No.18.

TABLE NO.18

Per capita expenditure on food and non food items by per capita expenditure groups.

PerCapita expenditure group.	Per capita expenditure			No.of House-holds	No.of per-sons
	Food items	Non-food items	Total		
8-11	7.24	2.01	9.25	2	12
11-13	9.05	2.70	11.75	2	17
13-15	10.12	3.03	13.15	6	63
15-18	12.82	3.30	16.12	8	87
18-21	14.87	4.27	19.14	11	78
21-24	17.09	5.79	22.98	12	91
24-28	10.73	6.06	25.79	19	147
28-34	23.13	7.27	30.40	49	389
34-43	28.48	9.23	37.71	34	222
43-55	35.62	12.16	47.78	43	277
Above55	43.70	23.50	67.29	30	175

16.2 The percentage distribution of per capita expenditure on food and non-food items is given in Table No.19.

TABLE NO.19

Percentage expenditure on food and non-food items by per capita expenditure groups.

Per capita expenditure group	Percentage Expenditure	
	Food items	Non-Food items
8-11	78.25	21.75
11-13	77.02	22.98
13-15	76.96	23.04
15-18	79.53	20.47
18-21	77.69	22.31
21-24	74.69	25.31
24-28	76.50	23.50
28-34	76.09	23.91
34-43	75.52	24.43
43-55	74.55	25.45
Above 55	64.94	35.06
All Groups	71.36	28.64

17. Co-operatives:

17.1 The co-operative Sector has been playing an important role in the economic development of the fishery industry in the recent years by implementing the scheme of mechanisation of boats, providing the credit, fishery requisites, sale of fish catch, in running cold storage plants, ice factories etc. Information was collected (house-hold-wise) on membership, purchase of requisites availment of credit and supply of fish to co-operatives for sale. Percentage distribution of the households is shown in Table No.20.

TABLE NO.20

Percentage distribution of the householdsby membership and other Aspects.

Item	Percentage
1. Membership of Co-operatives	76
2. Purchase of requisites from the Co-operatives	43
3. Availment of Credit from Co-operatioes	28
4. Supply of fish to Co-operatives for sale.	19

17.2 76% of the households have membership of the Co-operative Societies. That only 43% of the households purchase requisites from Co-operatives, it seemed that large no. of cooperatives had not taken to supply of requisities to the members. Since credit facilities were given by societies who arranged for sale of fish so that advances/credit can be recovered through sale proceeds, it seemed, yet a few societies had undertaken for sale of fish. Only 19% of the households supply fish for sale to the Co-operatives against availment of credit.

18. Indebtedness:

18.1 A household having an outstanding amount of loan on 1-7-1968, was treated as an indebted household. For this purpose short term loans and advances were excluded. Outstanding loans were classified as for fishery enterprise and other purposes. Loans for fishery enterprise included that for mechanisation of boat, construction of boat, purchase of gears, repairs to boat, engine, nets, etc. Loans for other purpose included that for purchase of agricultural implements, illness, marriage, normal maintenance etc.

18.2 Indebtedness in the fishemen community was widespread. 65% of the households were indebted.

TABLE NO.21

Percentage distribution of the outstanding loans by source and by purpose.

Source	Percentage of Outstanding Loans	
	Fishery enterprise	Other purposes.
1. Government.	33.1	3.4
2. Co-operatives	18.9	3.4
3. Bank	6.5	-
4. Private money lender	22.3	13.4
5. Traders &Commission Agents	4.3	3.4
6. Relatives & friends	14.4	74.2
7. Others	1.4	2.2
Total	100.0	100.0

18.3 It appears that in 7% cases the loan taken was put to use other than for purpose taken, the source being Government and Co-operatives. In about 37% cases the source of loan was private money lenders and friends and relatives for the fishery enterprise purposes.

18.4 The magnitude of the outstanding loans is indicated by the percentage distribution of outstanding amounts by ranges (Table No.22).

TABLE NO.22

Outstanding amount ranges	Percentage of outstanding Loans	
	Fishery Enterprise	Other purposes
1-499	35	58
500-999	22	28
1000-1999	17	8
2000-4999	17	6
5000-9999	5	-
above 10,000	4	-
Total ...	100	100

The average outstanding amount for fishery enterprise was Rs.1900/- and that for other purposes was Rs.535/-. The average indebtedness per household was Rs.2212.

18.5 Another important aspect of indebtedness is the source of loan and rate of interest. The distribution of the outstanding loans by interest ranges is shown in Table No.23. Most of the loans from private money lenders (both for fishery enterprise and other purposes) have a high rate of interest, above 10r%

TABLE NO.23

Distribution of Outstanding loans by interest rate ranges.

Source of Loan	0 to 4.99	5 to 9.99	10 to 14.99	15 to 19.99	20 to 24.99	Above 25	Not Reported
For Fishery Enterprise							
1. Government	30	5	-	-	-	-	11
2. Co-operatives	1	21	-	-	-	-	3
3. Bank	-	7	-	-	-	-	2
4. Private Money lender	-	3	18	3	3	1	3
5. Traders & Commission Agent	1	1	1	-	-	-	3
6. Friends & Relatives	-	-	3	3	4	-	10
7. Others	-	1	1	-	-	-	-
For other purposes:							
1. Government	1	2	-	-	-	-	-
2. Co-op.	-	3	-	-	-	-	-
3. Bank	-	-	-	-	-	-	-
4. Private Money lender	1	-	6	2	-	1	2
5. Traders &C.agent	1	-	-	-	-	-	2
6. Friends & Relatives	2	1	4	6	1	4	48
7. Others	-	1	-	-	-	-	1

19. Housing conditions:

19.1 A dwelling house was classified as pucca, semi pucca and Kuchcha according the material used in the construction of wall and roof as shown below:

Pucca House:	Type of roof	: Mangalore tiles Cement Concrete
	Type of wall	: Bricks, stone.
Semi Pucca: House	Type of roof	: Iron sheets, asbestos
	Type of wall	: Timber, Iron sheets, Tin sheets.
Kuchcha House:	Type of roof	: Straw, bamboo, country tiles, etc.
	Type of wall	: Mud, bamboo, etc.

19.2 Percentage distribution of the houses by the above classification is shown in Table No.24.

TABLE NO.24

Percentage distribution of the houses by type of structure

Type of Structure	Percentage
1. Pucca	29
2. Semi Pucca	39
3. Kuchcha	32
Total ...	100

19.3 Percentage distribution of the households by tenure status is shown in Table No.25

Tenure Status	Percentage
1. Pucca	94
2. Tonent	4
3. Free quarters in lieu of services	1
4. Others	1
Total:	100

19.4 Information was also collected whether the households had a separate kitchen or the living room was being used as kitchen. 63% households for a separate kitchen and 37% households had kitchen in the living room. The percentage distribution of the households by no. of living rooms is shown in Table No.26.

TABLE NO.26

Percentage distribution of the households by number of living rooms.

No.of living room	Percentage of the households	
	With separate Kitchen	Kitchen in the same living room
1. One living room	43	62
2. Two "	36	23
3. Three or more living room	21	15
Total	100	100

19.5 Only 16% of the households had the facility of the use of electricity.

19.6 The distribution of the households by facilities of sanitation and drinking water supply are shown in Table No.27.

TABLE NO.27

Distribution of the households by sanitation type and source of drinking water supply.

Type of sanitation	No.of House-holds	Source of drinking water	No.of House-holds.
1. Septic tank	1	1.Municipal tap	1
2. Bucket	1	2.Wells	215
3. Open space	214		
Total	216		216

19.7 The household having facility of bucket sanitation and Municipal tap as source of drinking water supply was the only household selected from the fishing village Chendani Koliwada, forming part of Thane City. The other household having Septic tank was the household from Chincheni in Dahanu Taluka, with modern construction.

APPENDIX - A

List of Villages according to classes by number of households in the Village.

Class -I with No.of households above 200		Class -II With No. of Households between 101 to 200.		Class-III With No. of Households below 101.	
Sr. No.	Name	Sr. No.	Name	Sr. No.	Name
1.	Dahanu	1.	Zai	1.	Bordi
2.	Popbran (including Dandi)	2.	Veror	2.	Gholwad
3.	Nawapur	3.	Chincheni	3.	Chikhali
4.	Murbe	4.	Ghiwali	4.	Narpad
5.	Satpati	5.	Madrai	5.	Dahanuagar
6.	Datiware	6.	Kelwa	6.	Darha
7.	Arnala (including fort)	7.	Usarni	7.	Terapore
8.	Bassein	8.	Edwan	8.	Karbode
9.	Naigaon	9.	Kore	9.	Ucheholi
10.	Uttan	10.	Kochiwade	10.	Aleaedi
		11.	Kalamb	11.	Kharekuran
		12.	Dongri-Chowk	12.	Shirgaon
				13.	Tembd
				14.	Kelwn-Mahim
				* 15.	Kelwa Dadar
				16.	Rangaon
				17.	Chendand-Koliwada
				18.	Ballunpada
				19.	Dunge
				* 20.	Kasheli

* No of household was selected from these villages.

PRESENT STATUS OF THE FISHING INDUSTRY OF GOA

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I N T R O D U C T I O N

In the economy of the Union Territory of Goa, Daman and Diu, the fishing industry occupies a position of honour as it offers vast employment to quite a sizeable population of this territory. Fish is a staple food for Goans who by and large are fish eaters, their percentage being about 90% of the population. It has a continental shelf of 5180 sq. km adjoining a coastline of 104 km. The productivity of these waters is greatly influenced by the fertile material discharged into coastal waters by seven rivers. Consequently, the blooms of plankton produced in the inshore waters sustain lucrative fisheries for pelagic fishes.

The territory was excluded from the fishery development programmes during the First and Second Five Year Plans, as it was under foreign rule. In 1957, four mechanised boats were introduced in this region. The main fishing activity was by indigenous crafts consisting of dugout canoes with outriggers. Beach seines (Rampani), gill nets and stake nets were the main fishing gears in use. The level of annual fish production at the

time of liberation of Goa was of the order of 10,000 tonnes. Upto this time only pelagic resource was exploited in a limited area upto 4 to 5 km from shore along the coast by the above mentioned traditional gears. There were no fish handling and preservation facilities.

It was only after the liberation that fishing development activities in an organised manner were taken up in this area by the Department of Fisheries which was careated on 2nd January, 1963. As basic data for planning the development of fisheries for this zone were not available, a comprehensive survey of fisheries resources and fishing industry was conducted. Based on this information, various schemes were drawn up during the remaining period of the Third Five Year Plan. Schemes like expansion of the exploratory fishing activities, mechanisation of fishing crafts, grant of financial assistance, providing landing and berthing facilities for various types of fishing vessels, training of fisheryouth, ice factories and cold storage facilities, collection of fishing statistics and expansion of fisheries research were implemented and as a result, considerable progress has been made in the fisheries section during the last 15 years. The main objectives of the fisheries development in this territory have been to increase fish production and to better the socio-economic status of the fishermen community who are the main pillars of the fishing industry. Upto the end of Fourth Five Year Plan, the development of fishing industry has been more or less individual-based or of the level of/cottage industry. However, with the commencement of the Fifth Five Year Plan it has assumed an industrial outlook, playing a major role in earning substantial foreign exchange, producing more nutritious food for its people, generating better self employment opportunities,etc.

/a

MARINE FISHERIES

From a humble beginning of four mechanised boats in 1962, Goa has increased its fishing fleet to over 360 by 1977 and its fish production to almost 4 folds from 10,000 tonnes to over 40,000 tonnes. This achievement has been possible due to the increase in the fishing activities undertaken by the small fishermen and introduction of modernised fishing techniques like purse-seining, trolling line. Goa has not only given a lead to the rest of the country in introducing purse-seining at first at departmental level but has also now passed on the technique to fishing community for commercial operations. Today there are nearly 46 purse-seine vessels operating in Goa waters. Following this success, the adjoining state of Karnataka has taken up purse-seining and introduced almost 80 vessels in its waters last year. Goa has now a fishing fleet of 360 mechanised boats and over 4000 non-mechanised boats which use trawl net, purse-seine, trolling lines, gill nets, shore seines, stake nets, cast nets and barrier nets. The mechanised vessels can be, by and large, classified as small to medium type (mostly 43' to 45' OAL) powered with engines in the range of 30 to 87 H.P.

Mechanisation of fishing crafts was for the first time started in Goa in 1963 to augment the marine fish production. To assist this programme a Fishermen Training Centre was started where fisher youths are trained in maintenance and repair of marine diesel engines, fabrication and operation of modern fishing gears and working knowledge of navigation. The trainees are given practical training in operation of various types of fishing gear on departmental vessels regularly. So far this Training Centre has trained nearly 300 candidates. Each trainee during the period of training is given a stipened of Rs.100 and a sea allowance of Rs.15/- per month. For advanced training in different trade courses like engine

drivers, shore mechanics etc., the department deputes trainees to various national institutes in different parts of the country, and so far about 30 persons have been trained in such courses. A scheme to provide financial assistance to subsidise the costly raw material like nylon, monofilament, cotton twine etc., was started in 1963. These schemes like mechanised fishing, training and subsidy on fishery requisites along with fishery survey for location of fishing grounds have helped greatly in increasing the marine fish production in this territory. So far the department has financed 168 marine diesel engines, 69 hulls and 14 trawl winches and another 10,000 fishermen have been helped for purchase of fishery requisites.

The advantages of mechanised fishing over traditional fishing have been well accepted by local fishermen and they have realised that instead of waiting for the fish to come to the shore to be caught by traditional gear it is more advantageous to go out and catch fish in offshore waters thereby not only increasing our yield but also extending the area of exploitation and the season. This also helps in reducing concentration of vessels in limited area thereby reducing competition among units. The Department has come out with suitable /purse-seine cum /trawlers (14.2 meters) which have better range of operation and sea endurance of 2 to 3 days. These vessels are fitted with 120 h.p. engines and the design has been duly approved by the Mercantile Marine Department, Bombay.

Repair facilities

In order to provide better repair facilities to avoid loss of fishing days by the mechanised boats whose number is increasing at a rapid pace, the department has already constructed a slipway. Facilities for service station are being provided close to slipway.

Ice plants and cold storage

In the early sixties, Goa has practically no cold storage facilities specially for fish. Ice production was of the order of 10 tonnes per day in whole of Goa and these plants with a individual capacity of 2 tonnes were located away from coast and the ice was mainly used for other purposes. At the end of 1977 the number of ice plants in the territory stood at over 20 with per day prdduction of 200 tonnes and 10 cold storages have been established both in private and public sector with an aggregate storage capacity of nearly 400 tonnes. It is a known fact that fish production is uneven during the year being maximum from September to January, lean from February to May and scarce from June to August. In order to make available fish throughout the year, the department has undertaken from 1966 to provide facilities like fresh storage, plate freezer, processing halls to private entrepreneurs on rental basis to avoid capital investment by smaller parties and such facilities are being fully utilised by many. The department has set up cold storages at Panaji, Canacona and Diu and it is proposed to develop similar facilities at Daman and at 3 or 4 more centres in Goa. At present, the department has 200 tonnes frozen storage space, 75 tonnes fresh storage, 4 processing halls, one plate freezer and 4 ice plants. It is only after 1966, after making these facilities available, that export of prawns and fish for the first time started from Goa.

Processing units and exports

In order to make available fish in scarce season the department took up freezing of fish in peak season and selling the same during monsoon period on experiemental basis. In Goa people do not prefer iced fish and as such there was need to create demand for such frozen

goods. Fishes like pomfret, mackerel, sardine, ghol, Rane, butter fish and seer fish which have a shelf life of 4 to 6 months have good demand. Now the department is trying to take up freezing on a larger scale and supply the same to actual consumer through departmental stalls.

INLAND FISHERIES

For the first time, culture of fresh water varieties like major crop was started by the department from the year 1964. Goa being a coastal area the demand for the fresh water fish is less. However due to the effort of the department now many private parties have taken up culture of carp in their tanks and demand for this type of fish seed is also increasing. Goa has taken up two major irrigation projects at Selaulim and Anjune which will be completed by 1970 which will increase the fresh water fish culture. Keeping in view the requirement of fish seed for these reservoirs the department is setting up a fresh water fish seed farm at Mayem lake, where induced breeding of carp will be taken up for stocking the reservoirs and meeting public demand.

BRACKISH WATER FISH CULTURE

Goa has good scope for development of brackish water fish culture along the banks of the seven rivers. The rivers traversing the region of Trikol Chapora, Mandovi, Zuari, Sal, Talpona and Galgibag have tidal influence ranging from 52 to 30 km inland from seashore. There are low lying fields on the banks of these rivers which remain submerged during the high tide and are marshy in nature. The extent of such areas is approximately 4000 hectares which can be gainfully utilised for prawn and fish culture. In order to undertake experimental work on the quick growing brackish water varieties, the department has set up a Brackish water fish farm at Ela Dhauji in Old Goa on the bank of River Mandovi. The total area of this

farm is 17 acres. This has in all eleven tanks having a total water area of 4 hectares. This farm is working very well where culture of tiger prawn/white prawn, milk fish, pearl spat and mullet is being done. Already a yield of 1200 kg. of fish per hectare has been achieved under polyculture experiments. Monoculture of prawns is also being practised and results achieved are very encouraging. In order to bring under fish culture 4000 hectares of fallow khazan land, the department has formulated a scheme to give financial assistance to prospective fish culturists for construction of tanks, desilting and construction of sluice gates. This will help to increase specially prawn production and also fish production during monsoon period for supply to actual consumer. After seeing the results of the work in the departmental fish farm, many small farmers are showing keen interest in taking up fish culture in their marshy fallow lands which till now had remained completely unproductive.

COOPERATIVE SOCIETIES

In the Union Territory of Goa, Daman and Diu as many as 10 primary cooperative societies were registered and some of these were functioning well. However, most of these societies ran into trouble after working for some years mainly due to their limited borrowing capacity and their working capital being blocked in construction of vessels for the society or in giving fishery requisites to members on loan. The recovery position being poor most of them became non-functional. However, in order to revive these societies, the department with the help of the Cooperative Department established a Fisheries Federation with an integrated fisheries project for which funds were obtained from the Agricultural Refinance Corporation and other financing agencies. The Federation was registered in 1971 and started actual functioning from March 1974 with the following main objectives:

1. To increase fish production by means of introducing mechanised fishing crafts and modern methods of fishing; 2. to undertake storage, distribution and marketing of its members' catches at reasonable rates; 3. to supply fishery and allied requisites as well as credit facilities to fishermen specially during offseason to save them from the clutches of money lenders; 4. to strengthen the primary fishery cooperative by providing them enhanced borrowing facilities at lesser rate of interest and minimum procedural formalities to help its members and boost the fishing industry of this region; 5. to set up net making plants, service station, chain of cold storages, distribution transport system and making available to actual consumer his most relished item of diet at prices within his means; and 6. to raise the socio-economic status of fishing community by providing them necessary social facilities and training in latest fishing technique.

No doubt the Federation has helped the fishermen in acquiring vessels, both trawlers and purse-seiners-cum-trawlers, and has also advanced loans (short term) for various other purposes like purchase of fishery requisities, repair facilities etc. but its performance on the marketing side has been far from satisfactory. The Federation has also ~~opened a fair~~ price fish stall. It has already set up a 5 tonne ice plant at Panaji with fresh storage facilities and is installing a diesel pump at jetty for supply of diesel to its members and in return it will be possible for the Federation to take the fishcatches of these boats (excluding prawns) for local consumption. It has to develop its own transport facilities so that ~~fish catch~~ from its members could be collected, preserved, transported and supplied to actual consumers at reasonable rates. The Federation has yet to make its mark in this field.

From the above detailed account it will be seen that the fisheries development in this area has made a marked impact on the economy of fishermen and the industry in this territory.

ROLE OF SMALL SCALE FISHERIES IN KARNATAKA AND ITS IMPACT ON RURAL ECONOMY

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Karnataka Government have been actively considering for the past few years, how to bring in the traditional fishing sector under modernisation to improve their professional prospects and productive capacity so as to achive better socio-economic prosperity to the community leading to the development of coastal rural sector. It was also the consideration of the Government how to replace the hard manual labour of the fishermen in the sea as well as to reduce their exposure to risks at sea with mechanised methods that would improve the catching power and extend area of operation as well as speed up trips to and fro the ground. A silent transitional change of the traditional sector into mechanisation together with convincingly demonstrative economic results by the change was aimed at to achieve slowly but steadily. A direct transformation from age old practices was not desired. Instead, a policy of expanding mechanisation into new fields and introducing mechanisation into the traditional sector first at demonstrational level were thought of. Accordingly, purse-seining was introduced in 1975 -76 in the state which had proved to be a great success. This necessitated recruitment from traditional sector to mechanised sector in considerable numbers. Government incentives were also offered for groups of traditional fishermen who came forward to launch purse-seining, to the extent of Rs. 60, 000 per unit as subsidy and soft

loans. About 50 purse seine units are expected to be operating under this scheme by the end of 1978-79, employing more than 1,000 active traditional fishermen. By the end of 1978-79, Karnataka would have a total of about 200 purse seine units operating on the coast which would be directly employing more than 4,000 active fishermen. Most of these fishermen have to be supplied naturally by the traditional sector.

In addition to this, motorisation of country canoes for mechanising gill netting for better exploitation of the columnar fishes is being introduced for the first time in the state. To start with, 10 inboard kerosene-operated and 13 petrol-operated outboard motors have been procured by the department for this purpose. It is expected that this scheme would become popular among the traditional fishermen soon and would catch up to cover a large number of traditional units. This scheme is expected to bring in at least 6000 traditional active fishermen in the state under mechanisation. The state has already 1500 mechanised fishing vessels employing about 7500 active fishermen. The total number of active fishermen in the fishing sector of the state today is 23,000. This works up to the fact that the state would be having only about 4000 to 5000 fishermen left over on the traditional sector after some years and their main operational sector would possibly be the river mouths and backwaters. A considerable number among these would be in a sector of subsistence fishing. This residual sector is inevitable under the Indian condition and could be expected to continue as individuals employed part time

as well as full time. By the time, the state expects to develop subsidiary coastal fishery activities like mari-culture and large scale seed collection etc., that would provide additional area of economic activity for this fishermen to improve their earnings. When this silent revolution of Karnataka is completed, the traditional marine fishermen of the state would be a comparatively elevated sect socio-economically.

FISHERIES DEVELOPMENTAL BACKGROUND

Fisheries development in Karnataka could only be intensified in a planned and orderly way from the second year of the country's second Five Year Plan when an independent Fisheries Department with its Directorate at Bangalore was established in 1957-58. The coast stretches over a distance of 300 km embracing a continental shelf extending up to 25,000 sq.km. The three fishing sectors of the state are the traditional fishing, the mechanised trawl fishing, and the recently developed purse-seining sector. Before starting purse-seining, the traditional sector in the state was the major fishing force contributing up to 75% of the total marine fish landings in the state. But from last year mechanised sector has taken over as the leading contributor to the states' total landing. The marine catch of the state during the last year (1977-78) was 126,726 metric tonnes valued at Rs. 137.27 million at boar side price. It was constituted by 61,988 tonnes from the traditional fishing sector, 34,187 tonnes from the coastal trawl fishing sector and 30,551 tonnes from the purse-seining sector. The year 1977-78 has thus witnessed a historic record change in the pattern of fish landings

in the state by the mechanised fishing sector crossing the traditional sector in fish landings for the first time in the country, the share of each sector being 51% and 49% respectively against 40% and 60% respectively in the previous year. The current trend of the landings by the purse-seiners during the year suggests that the total marine landings in the state would cross 1.5 lakh tonnes during 1978-79 and further reduce the percentage of landings by the traditional sector.

FISHERY RESOURCES

Karnataka coast, popularly known as the "mackerel coast" of India, abounds in pelagic resources. The state's landing every year has been influenced by violent fluctuations of her pelagic fishery which is predominated by the mackerel and the oil sardine. These two species alone has been forming up to 70% of the total landings in the state. The prawn fishery contributes another 7-10% to the total. Cat-fish, shark, ribbon-fish, silverbelly, pomfret, seer fish, sciaenids, soles and Lactarius are the other major landings on this coast. Still, only about 20% of the continental shelf area is being exploited. The State Government, however, has been making earnest efforts to persuade the fishermen to diversify fishing methods and to explore new fishing grounds to cover more fishable areas. It is estimated that an additional one lakh tonnes each of mackerel and oil sardine could be produced in the state from the base level catch of 1977-78. The west coast fishery resources of mackerel and oil sardine have been estimated at 3 lakh tonnes and 4 lakh tonnes respectively by the FAO/UNDP Pelagic Fishery

Project at Cochin. It is also reported that the shoal concentration of these species has been relatively dense in the Goa-Mangalore area, particularly off Malpe in Karnataka, beyond the 30 metre depth line. Through mechanisation of gill netting and long lining the present production of food fishes could be doubled. Midwater trawling, the introduction of which is being planned for, is expected to add substantial quantity to the total landings of the state.

Marine Production during the 5th Plan period

Sl. No.	Species	Quantity in tonnes			
		1974-75	1975-76	1976-77	1977-78
1.	Mackerel	3,760	16,372	7,667	36,205
2.	Oil Sardine	36,300	43,541	18,248	33,491
3.	Cat fish	2,052	2,400	1,998	3,034
4.	Shark	1,544	827	904	2,309
5.	Ribbon-fish	570	61	624	1,783
6.	Silverbelly	2,287	582	934	1,348
7.	Pomfret	340	662	352	1,039
8.	Seer fish	2,276	1,211	1,237	947
9.	Sciaenids	995	864	744	639
10.	Lactarius	356	197	264	473
11.	Prawns	6,977	6,606	5,520	9,093
12.	Others	14,970	15,103	24,393	36,365
	Total	72,627	88,426	62,785	126,726

FISHING CRAFTS

Mechanisation and modernisation on the fishing front

in the state have made good progress. Starting from two small mechanised boats two decades ago, today the state has 1650 mechanised fishing fleet including 100 purse-seiners of 43½ ft, and 45 ft, size. The 1550 boats are trawlers of 30 ft, 32 ft, and 36 ft size engaged in the coastal prawn fishery. The investment for the purse-seine fleet in the state from 1975-76 to the end of 1978-79 would be Rs. 8 crores.

On the traditional sector, it is estimated that the state has a gross number of 8000 indigenous dug-out and plank built canoes, which are partly engaged in the traditional coastal fishing and partly in fishing in the river mouths and backwaters. The recent trends on the fishing side indicate the possibility of a diminishing importance to the traditional sector and a professional shift to more promising mechanised sector in the state. However, the indigenous fishing methods are still a strong force on the fishing side. Motorisation of country canoes by outboard as well as inboard engines has already been initiated in the state to develop the columnar fishery by gill netting and the like. Large-scale motorisation of country canoes is planned for under the proposed Integrated Fisheries Project at Tadri under foreign collaboration.

TRADITIONAL FISHING GEAR, OPERATIONAL RANGE, AREA AND TYPE

About a dozen major gears are in regular use in the state, out of which the giant "rampany" of Karnataka is a speciality of the state. There are about 140 rampanies

in the state engaged in the catch of pelagic fishes mainly mackerel and oil sardine, contributing to about 70% of the total traditional catch. The following are the gears of the traditional sector.

1. Rampany (large shore seine)

The net is so big that 60-80 people are required to operate one unit. It can encircle any big shoal but within a range of about 3 km from the coast. Tonnes of mackerel or sardine are caught in one successful operation. The net is operated throughout the coast except Ullal.

2. Kairampany (Small shore-seine)

The application and area of operation are all the same as in the case of rampany. But the net is small compared to rampanies and are operated by about 30 fishermen.

3. Kantha Bale (drift net)

The major food fishes are caught by it. The net is used throughout the state within an operational range of about 5-7 km from the coast.

4. Pattea Bale(Encircling gill net)

This also is used throught the coast but mainly in Dakshina Kannada. Its range of operation is within 5 km from the coast.

5. Chala Bale (Small meshed drift net)

Used throughout the state but mainly in Dakshina Kannada. It operates up to a range of 4-5 km from the coast. coast.

6. Maari Bale (Bag net)

This net is specially designed to catch mainly the cat fish and hence it is also called "cat fish bag net". Sciaenids and other fishes are also caught. The net is operated by two canoes holding the two wings of the net which ends in a bag. Operational range is within 7 km from the coast.

7. Kettu Bale (Bottom set gill net)

Mainly used in Dakshina Kannada in Ullal, Mangalore, Kulai, Kaup, Malpe and Gangolli. The net is set at night and hauled in the early morning. During monsoon the net is used for fishing in river mouths.

8. Odu Bale (Drift net for night fishing)

It is largely used in Ullal, Mangalore, Kulai, Hejmady, Kaup, Malpe, Gangolli and also in Karwar, Keni, Murdeswar, Bhatkal in Uttara Kannada.

9. Beesu Bale (Cast net)

Used throughout the coast in all seasons. Mainly during August this net catches a lot of prawns, chiefly Metapenaeus dobsoni and Penaeus indicus and also sole and silverbellies.

10. Bepu (Long line)

Used throughout the coast and mainly in Ullal, Mangalore, Malpe and Gangolli. Operated in the night and to a range up to 10 km from the coast.

11. Iliyuva Bale (River trawl nets)

It is operated by two fishermen and is used only around Mangalore.

12. Sithira Bale (Stake net)

Operated by fixing the funnel shaped net to stakes against high tide. Used in Uttara Kannada and prevalent in Agnashini backwater areas.

In addition to the above, hand picking of clams, mussels and oysters form a considerable activity on the traditional sector employing about 300-350 fishermen in the state. Among this, clams form a major fishery on the coastal belt especially during monsoon months.

Sustenance fishery.

Though a separate sector call sustenance fishery is not demarked, fishing activities by individual fishermen, especially the aged, children and invalids, are a part of the traditional sector in the state. The major tackles are the country made rod and line, basket traps, marginal dragging etc.

INFRASTRUCTURE

Berthing and landing facilities

Along the 300 km coast of the state there are more than 100 traditional fish landing centres catering to the needs

of about 8000 country crafts. For the mechanised sector, there are 19 river mouth ports provided with either wooden or concrete jetties and many of them are attached with auction halls. These 19 ports and most of the traditional landing centres are well connected with fishery approach roads. Besides these, the Karwar fishing harbour provides berthing and landing facilities for the vessels including bigger off-shore going vessels. The all-weather Malpe fishing harbour, the construction of which is fast progressing, when completed would accommodate 21 deep-sea trawlers of above 23 metre size and 46 purse-seiners of above 14 metre size. The Honnavar fishing harbour which is nearing completion would accommodate 20 purse-seiners of above 14 metre size. Both these harbour projects together would produce an additional catch of about 50,000 tonnes of fish annually. With all the existing landing and berthing facilities itself, the Karnataka coast is all along brisk with fishing and fisheries activities.

PRESERVATION, PROCESSING, EXPORT AND MARKETING

Staring with one ice plant of 5 tons capacity per day, one freezing plant of 5 tons capacity per day one cold storage of 60 tons capacity per day and one frozen storage of 80 tons capacity per day at Mangalore in the early fifties, today the state has 78 ice plants with a total capacity of 781 tons per day, 27 freezing plants with a combined capacity of 117.5 tons/day, 32 cold storages with a capacity of 796 tons storage besides 2361 tons of frozen storage capacity. In addition to it there are 3 modern fish meal plants and 12 canning plants besides a

number of fish oil extraction units. Freezing industry in the state took its present day level of development from the middle of the sixties and today there are about 50 registered exporters in the state. The commissioning of a major commercial harbour at New Mangalore in Dakshina Kannada during 1974-75 has given a further fill up to the expansion of the fish freezing industry in the state. Today this state's freezing capacity can be generally expressed as one freezing plant for every 11 km coast or one tonne capacity of freezing per day for every 2.5 km length of the coast in the state. The annual export from the state has reached to Rs. 12 crores from a finished product of about 5000 tons per year.

In the earlier days the state had a flourishing fisheries by-products trade in oil extraction and guano manufacture which is still an important local cottage Industry besides fish curing. In 1966-67, there were 101 fish oil and guano production centres on the Dakshina Kannada coast alone.

Marketing of fish to the advantage of the fishermen and at their choice was made possible by the 77 fishery approach roads constructed at an approximate cost of Rs. 32 lakhs by the department connecting fish landing centres with motorable roads to markets and high ways, in addition to the adequate availability of ice and cold storage facilities. This has made it possible today for the fish from Karnataka Coast to reach markets hundreds of kilometres away at Bombay, Madras, Kerala, Bangalore and Goa in iced fresh condition. The Fisheries Corporation of the state had been doing yeomen service in supplying fish to important consuming centre in the state in frozen

condition through a "Cold Chain" established for the purpose from the production centres on the coast to the consumer points in the interior. The general trend of fish marketing in the state is represented by the disposition of catch during the year 1977-78.

Marketing as fresh	.. 53%
Utilised for curing	.. 28%
Utilised for freezing	.. 7%
Utilised for reduction to meal and oil	.. 4%
Utilised for canning	.. 0.5%
Utilised for manure	.. 3%
Utilised for miscellaneous	.. 4.5%
Total	.. 100%

BOAT BUILDING AND GEAR FABRICATION

To import boat building technology and to construct mechanised boats for distribution among groups of fishermen on their completion of training in the Fishermen Training Centres, two boat building yards at Mangalore and Karwar were established in the later part of the Second Five Year Plan. The local builders soon picked up the modern technology of boat building and started construction of mechanised boats from the beginning of the sixties in the state. Today there are 28 boat building yards on the coast in the private and co-operative sector with a capacity to build boats up to 45 ft size at present.

For gear fabrication, a modern net making factory had been established in the Bellary district at Tungabhadra. The factory has machinery for knotless webbing, knotted webbing and for twisting. The annual production is estimated at 15 tonnes of netting. Nets from this factory are very popular among fishermen and orders are received from many other states also.

SOCIO-ECONOMICS

There are 151 fishing hamlets dotted along the coast of the state. Many of these villages are connected by the fishery approach roads to the highways and markets. These road communication facilities speeded up extension of electric services to many landing centres and fishing villages. The marine fishermen population in the state by the beginning of 1978 is estimated at 1,40,750 with a proportion of adult male to female at 37 : 40. The active adult fishermen engaged in fishing in the state for the same period is estimated at 22,500. While many fishermen own mechanised boats and traditional crafts individually or jointly, many others are working on a catch share system or on mutually agreed other remunerative basis. In Karnataka a family of 7 can generally be considered as having at least two active fishermen on the fishing side and another two, as part time or full time, engaged in other trades connected with fish marketing, fish net making and repairs, fish processing and curing and other auxiliary fisheries works like fish transportation etc. On the marketing side, fisherwomen play, an important role in Karnataka. As per a census in 1972, there were

13,500 fishermen (both sex) in fish marketing works, 5,700 in net making and repairs of net, 2,000 in fish processing and curing works and 5,500 in all other types of fisheries works. Therefore, the source of income of a fishermen family in Karnataka is not from fishing alone. However, the income of an active fisherman from fishing is a major indicator of the family income. The annual gross income per active fisherman from fishing for the past 5 years is given below (estimated figures)

Year	Landings (tonnes)	Value in Rupees	No.of active fishermen	Yearly gross income per active fishermen (Rupees)
1973-74	76,542	1039,95,306	20,443	5,087
1974-75	72,627	582,54,169	20,709	2,813
1975-76	88,427	966,41,038	21,369	4,522
1976-77	62,785	810,74,977	21,811	3,717
1977-78	126,726	1372,72,554	22,411	6,125

Fishermen in Karnataka as a community, are an enlightened sect having many a number of highly educated men, successful entrepreneurs, eminent politicians, executives and administrators. Professionally, Karnataka fishermen are second to none. The general educational standard among fishermen is comparatively high. A random survey conducted in 1974-75 among 483 fishermen from 32 fishing villages of the Dakhina Kannada District had revealed that education up to high school standard was common and only about 10% of the persons surveyed did not have any education at all. There are three fisheremen

journals in Dakshina Kannada District, namely, Mogaverra, Matsya Loka and Meenugara, published by the fisherfolk projecting their voice in the state. In addition, there is an "All Karnataka Fishermen Federation" to take care of the fisheremen's interest in the state.

DEVELOPMENT PLANS

Main marine fisheries development plans proposed under the VI Five Year Plan are as follows:

Scheme	Outlay (Rs. lakhs)	Physical target
Assistance to traditional fishing	33.50	Assistance for outboard motors, 30 mini purse-seines 300 gill net units and nylon net covering 2000 fishermen
Mechanisation of fishing craft	59,50	Subsidy to 210 marine diesel engines and 110 purse seine nets
Deep-sea fishing (subsidy to above 20 metre vessel)	20.00	Subsidy to 13 vessels
Corporation	45.00	As share capital
Mariculture	51.00	75 hectare of farm to be constructed and 50 tons of prawns will be produced
Maintenance of harbour & berthing facilities	10.00	19 fishery ports to be maintained
Construction of fishery roads	15,00	45 km of road to be laid
Research, training and extensi on	72.47	(both for marine and in-land)

Scheme	Outlay (Rs. lakhs)	Physical target
Assistance to Cooperatives	18.85	(both for marine and inland)
Infrastructure facilities to coastal villages	17.00	(25% of the state's share)
Indo-Danish Project	35.00	(State's initials share)

SUBSIDY AND LOANS

For traditional fishing one third of the cost of nylon and 25% of the cost of outboard motor are granted as subsidy. For mechanised fishing 25% of the cost of engine limited to a maximum of Rs. 20,000 in individual case, 25% of the cost of purse-seine net to the maximum of Rs. 20,000 are granted as subsidies. Besides, managerial cost of Cooperative Societies at 100% in the first year, 75% in the 2nd year, 50% in the 3rd year and 25% in the 4th year is given as subsidy from the Government.

FISHERIES COOPERATIVES

There are 58 primary Cooperative Societies and two Cooperative Fish Marketing Federations in the marine side covering about 75-80% of the active fishermen. Three of the Fishermen Cooperative Societies have taken up commercial curing of fish with improved methods

under the N.C.D.C. assistance totalling Rs.2.88 lakhs. A Cooperative Society, exclusively for fisherwomen has been organised at Malpe for the first time in the state.. Financial assistance from the Government in the form of loan and share capital to cooperative institutions in the state rose from Rs. 14.57 lakhs during 1967-72 to Rs. 69.18 lakhs during 1972..-77. It may be interesting to note that the first fishermen cooperative society was started at Mangalore almost 60 years ago.

FISHERIES CORPORATION

Karnataka Fisheries Development Corporation was set up on 1-1-1971 at Mangalore to handle development of commercial fisheries in the state. The important commercial activities taken up by the Corporation are as follows:

1. Commercial fishing with deep-sea trawlers.
2. Ice production and sale of ice.
3. Fish processing (freezing and export).
4. Freezing of fish and prawns and internal marketing through a "Cold Chain" established for it connecting the production centres to the consumer points in the internal towns through about 19 retail centres.
5. Lending space for freezing and storage to private processors on rental basis.
6. Maintain a chain of ice plants, chill storage,
7. freezing plants and frozen storages.

The Corporation is running 5 major fish freezing plants with a combined capacity of 48 tonnes/day with a frozen storage capacity of 850 tonnes. It has a total

ice production capacity of 72 tonnes per day with a chill storage capacity of 197 tonnes.

EDUCATION AND TRAINING

Fishing villages, being far flung in the remote coastal area, insufficiently or in some cases hardly connected to nearby towns and developed areas in the earlier days, would have remained neglected educationally, socially and professionally but for the departmental efforts started decades ago in starting fishery schools up to high school standard in the interior coastal area and fishermen training centres to impart modern fishing skill. The 53 schools(primary,middle and high schools) built and run by the department along the coastal area played a pivotal role in the socio-economic and educational level attained by the fishermen in the state. The schools, after having achieved the purpose of providing educational facilities in the interior coastal area, have been transferred to the Educational Department from 1975-76. To improve the professional competency in modern fishing, 4 Fishermen Training Centres were established during the Second Five Year Plan end in the two coastal districts of the state to give training in mechanised fishing and in fabrication of modern fishing gears. In addition to it fishermen boys are sent for training in Central Institute at Cochin and Madras regularly in various special courses. About 2900 fishermen have already been trained in mechanised fishing in the state and about 150 in Central Institutions.

HOUSING AND REHABILITATION

Fishermen who do not have own houses are being rehabilitated under a rehabilitation scheme started from 1966-67. House sites were alloted to fishermen under other Government schemes like the Janatha Housing Scheme, Ru ral Housing scheme and under the 20-point programme. Under all these schemes about 300 houses and 1750 house sites were alloted to fishermen in both the coastal districts alone.

COASTAL INFRASTRUCTURES SCHEMES

Under the Centrally Sponsored Scheme for providing infrastructural facilities to fishermen villages, Shiroor in Dakshina Kannada and Alvekodi in Uttara Kannada were selected for improvements at a total cost of Rs. 2.96 million. This scheme will provide facilities like ice plants, water supply, fish drying units, community halls, roads etc.

CREDIT FACILITIES AND MECHANISM OF OPERATION

To stimulate the fisheries development, the department encouragesthe private sector and commercial banks to invest in the fishery industry. The banking institutions in the state, mostly on advice from the department, have been responsible for more than 60% of the total fishery

investment in the state. On the fishing side, the banks contribution in providing loans has been very significant u p to 65-75% of the total investment with an initial repayment period of about 60 instalments at an interest rate of 12½%. The bank gets the loan refinanced by the A.R.D.C. In other cases the interest may go up to 14-16%. During the 3 years ending with 1978-79, the total investment on purse-seining fleet alone in the state is estimated at Rs. 8 crores and this huge investment in one sector alone was made possible by the financing institutions like banks and the Karnataka State Financing Corporation. The later charges interest at 9% only.

CONFLICTS BETWEEN TRADITIONAL FISHERMEN AND THE MECHANISED SECTOR

The fishermen of Karnataka are capable of great tolerence and adoptability to changing situations as they generally believe in modernisation for achieving socio-economic betterment. In addition to this, the traditional fishermen of the state have always been showing qualities of resilience and accommodative spirit to mechanisation. Perhaps there might have been ripples of resentment towards mechanisation but they were only temporary and local. The approach of the department in taking care of both the sectors is also a contributing factor for the comparatively peaceful and amicable atmosphere prevailing on the Karnataka Coast.

LEGISLATION

No fishery legislation has so far been promulgated in

Karnataka. However, a Fishery Act is being formulated for better managment of fisheries and its development in the state.

MARICULTURE

The state has 4000 hectares of culturable brackish water area an d the mariculture unit started at Karwar had conducted brackish water culture mainly to study the commercial possibility. The harvest consisted of 30% P.indicus, 30% M.dobsoni, 10% P.mondon, 20% mullet and 10% miscellaneous. A scheme has already been sanctioned under the Centrally sponsored Scheme with an outlay of Rs. 14.63 lakhs.

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STATUS OF TRADITIONAL FISHERIES IN KERALA

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The physical geography of Kerala State, with about 590 km of sea coast on the west and the mountain ranges on the east interspresed with a net-work of 44 river systems along its breadth is certainly one of the chief reasons for fish becoming an important source of food for the people of the State. Fishing in the high seas is an age-old avocation that has been carried out by certain communities who have from time immemorial lived along the coastline of Kerala.

The traditional fishermen have been socially and economically very marginal, undertaking fishing primarily for subsistence. Over the years they have perfected several techniques of fishing, and developed craft and gear suited for their local conditions. Two types of fishing crafts have been used traditionally. They are the canoes and the catamarans. The canoes are either of the dug-out or plank-built type.

CRAFTS

Dugout canoes

The dugout canoes as the name implies, are made by scooping out the wood from a single log of mango or jungle jack. The keel portion is left thicker than the sides. Often it is not possible to get the total symmetrical shape from the log and the 'patches' have to be panelled with planks of teak wood rivetted on to the main body with nails. The dugouts are of three sizes-the large ones of over 10 metre length are called odam or vanchi, the middle sized ones

called thonies measure about 9 metres, and the beputhoni which is about 8 metre long is the smallest type. The width and depth of the three types of dugouts range from 0.7 m to 1 m and 0.8 m to 0.9 m respectively and their displacement ranges from 2 tonnes to 5 tonnes. The odams carry a crew of 7 to 11 fishermen and the thonies from 3 to 6. The larger dugouts are used in pairs for operating boat-seines and the smaller ones used singly with gill-nets, drift nets or the hook and line sets. None of them are provided with rudders and steering is effected by means of a big paddle which is used for propulsion as well as control. Sails-either square or triangular are used by some. Dugout canoes are used during the fine weather months from October to May.

Plank-built Canoes

These canoes are made by building a body of wooden planks with or without ribs on the inside. The wooden planks are seamed together with coir rope and the craft is made water tight by applying a layer of black pitch on the inside. They are of two sizes-both called vallams-one about 11-12 m long 11.5 m wide and 0.8 m deep. Their displacement varies between 3 to 5 tonnes. The larger ones are capable of carrying 9 to 11 persons and the smaller ones 3 to 6. The plank canoes also have no rudders and use paddles for steering and propulsion. Sails are used only occasionally. The larger ones can be used immediately after the monsoon in August when the waves are still high and the sea turbulent. The smaller ones can be used only in the calmer seas from October to April. From the plank canoes, gill nets, drift nets and hook and line sets are operated. They are used also in the operation of shore-seines.

Catamarans

The word is derived from the Tamil 'Kattumaram' which aptly describes the nature of the craft. It is basically a crude raft made by tying 3 to 5 logs of soft wood together securely at the two ends with coir ropes. If more than 3 logs are used, then the rope is tied around the ends with a cross piece cut in the shape of stumped bull's horns. Catamarams are also of two broad sizes, the larger ones of dimensions 7.5 to 8.5 m long and 0.8 m wide and the smaller ones 4 to 5 m long and 0.6 m wide. The larger ones can carry 3 to 4 persons and the smaller ones not more than two. The catamaran is by far the most rudimentary craft used by any group of traditional fishermen the world over. For all its disadvantages, (from the point of its inability to provide even the bare minimum protection to its occupants from the waves and the wind), it is the only craft that is unsinkable and that can be launched from any point on the coast, at any season of the year. Once across the surf it proves an excellent and fast sailing craft. It is light and uses a triangular shaped sail, the base of which is attached to a bamboo pole which is often longer than the craft itself. The catamaran is propelled with split bamboo oars of 2 m length. Catamarans can be used in pairs to operate boat seines or indivdually to onerate gill nets, drift nets and hook and line sets.

Unfortunately systematic collection and publication of data on the number of these crafts is scanty and what is available is rather unreliable. Over the period 1957-1973 we have four sources that give an estimation of these crafts at five points of time. These estimates are shown in Table-1.

Table 1 Estimated number of traditional fishing crafts in Kerala.

Year	Catamarans	Canoes Plank-built	Dugouts	Total
1957-58	1 8280	3173	8774	20,227
1961-62	2 na	na	na	20,227
	Big and small boats			
1966	3 6056	12476	8964	27,496*
1972	3 9719	11010	9865	30,594*
1973	4 3708	4720	16672	25,100

na - Not available

* includes craft used for inland fishing.

Sources:-

1. Census of Fishermen's Assets and Liabilities Department of Fisheries Administration Report 57-58.
2. Census of Fishermen and fishing craft for All-India Maritime States, CMFRI Bulletin, No-13, July, 69.
3. Kerala State Livestock Census Reports, 1966 and 1972.
4. Govt. of Kerala, Development Department, Integrated Fisheries Development Project for Kerala, 1975.

GEAR

The types of fishing gear used in marine fishing in Kerala by the traditional fishermen are quite numerous. There are basically three types of nets-shore seines, boat seines and gill nets-and several types of hook and line set. In the case of nets, the qualifying nouns indicate broadly the nature of the net.

Shore seines

These nets are usually bag-shaped with coir-wings of extensive lengths of over 1500 metres. One end of one of the wings remains on the shore. A plank-built canoe moves out across the surf paying out that wing until the bag-shaped net is reached. Thereafter the net is also put out and the canoe returns to the shore paying out the second wing and brings its extremity to another point on the shore. In this process the canoe makes inverted V- shaped course from one point on the shore to the other point which would be separated from each other by about 100 to 200 metres depending on the size of the seine. After the seine has been deposited in the sea in the above descibed manner, the two ends are simultaneously and gradually pulled in by two parties, each of 15 to 20 fishermen. Shore seines are used all along the coast of Kerala mainly during the calmer seasons between November and March/April and it is the pelagic, shoaling fishes (oil sardines, mackerel, anchovies, etc.) that are caught in it.

Boat seines

These are conical, bell-shaped or bag-shaped nets, fabricated from cotton or nylon yarn. Sometimes wings are used. On the cotton nets wings made of coir and in the case of nylon nets wings made of monofilament plastic are used. The open end of the boat seines normally have larger meshes which decrease in size towards the closed end. The boat seine is operated using two canoes or catamarans which pull at either end of the wings thus keeping the mouth of the net open and hence making the fish swim into the narrower end. Sometimes scaring devices made of wood or coconut leaf are used to beat the water

or the side of the boats to drive the fish into the nets. Boat seines are also normally used to fish for pelagic and mid-water shoaling species. They are used all over Kerala during the seasons when the above mentioned types of fishes are available in the inshore waters. At least 5 persons are required to operate a boat seine and this number can increase to as many as 25 depending on the type of craft used, the size of the seine and the nature of the fish to to be caught.

Gill nets

These are single walled nets which may be of the 'set' or the 'drift' type. The set-type gill nets may be used from a stationary craft (anchored in the fishing area) and can be either surface or bottom set nets. The drift-type of all gill nets are attached to the side of a catamaram or canoe and the craft and net drift along with the current. Fish are caught in the net when they swim into it and get their gills entangled in the mesh. Gill nets may be made of cotton or nylon yarn. It is the position (surface or bottom--this is varied by attaching or removing the weights fixed to the lower end of thenet) and the mesh size which will determine the type of fish caught in it. Gill nets are also used all along Kerala's coast. They can be operated by as little as 2 persons on a catamaram or as many as 12 on a canoe--depending on the length and the weight of the net.

Hook and Line

The hook and line units are generally used for fishing in deeper waters. Unlike with nets, the fish has to be baited by live or artificial bait attached to the hooks. The line is weighted down either with iron weights or stones. It is the weights which will determine the

position which the line will take in the water. Consequently it is the size of the hooks which are attached to the line and the depth to which the line sinks that will determine the nature and size of fish caught. After the line is dropped the craft may either remain anchored or drift along with the current. The end of the line in the fishermen's hand is gently jerked to attract fish to the bait. Once a fish bites at the bait, the line is drawn in, the fish removed and the process repeated. Fishing with the hook and the line is not undertaken by many fishermen. The greater depths to which they have to go, the longer time that is taken and the very strenuous nature of this kind of fishing are the major constraints. The more daring and adventurous of the traditional fishermen, notably the catamaram fishermen of the south, are experts in this type of fishing. Normally it is undertaken when the fishing in the inshore waters is not lucrative or when fish is scarce in this region.

The statistics relating to fishing gear have been collected by the Livestock Census of 1966 and 1972 and by the Department of Fisheries in 1957-58. The latter related only to the Marine fisheries sector and are much more reliable. The former include both the marine and inland sectors and the wide variations exhibited, along with the total non-enumeration of hooks and line sets make the data very questionable. However, the disagregated figures are shown in Table 2.

Table 2 Fishing Gear/tackle in Kerala State

Type of gear/tackle	1957-58	1966	1972
Shore seine	4,501	6,617	8,224
Boat seine	21,281	2,909	-
Gill net	-	-	35,919
Drift net	35,778	-	-
Drift and gill nets	-	30,907	-
Drag nets	-	-	19,988
Trawl Nets	-	7,555	16,500
Cast nets	-	99,271	11,273
Scoop nets	-	18,246	-
Spawn collecting nets	-	-	977
Fixed & Stationary nets	-	1,918	-
Traps	-	-	-
Hook & Line sets	16,312	-	-
Bag & Purse nets	-	12,484	-
Others	-	17,416	23,554
Total	77,872	197,323	134,853

Sources:- 1. Census of Fishermen's Assets and Liabilities - Department of Fisheries Admn. Report, 1957-58.

2. Kerala Livestock Census 1966, 1972 (Includes inland fishing gear and tackles).

FRESH AND BRACKISH WATER FISHERIES

The inland water resources of the State comprise of fresh water rivers, canals, tanks, ponds and reservoirs; brackish water lakes, backwaters and the adjoining low fields, canals, ponds, mangrove swamps and estuaries. The estimated extent of different types

of inland waters in the State are as follows:-

Table 3. Inland water resources of Kerala

Type of inland water	Estimated area (ha)
Rivers	85,000
Tanks and ponds	3,300
Reservoirs	24,137
Brackish water lakes	97,100
Backwaters including mangrove swamps	2,02, 300
Estuaries	40,300
	4,52,137

About 24,400 fishermen living in 167 fishing villages, are engaged in inland fishing activities. The coastal fishery is occupied by 99,000 fishermen. Both capture and culture fisheries contribute to the fisheries of the fresh as well as the brackish waters. The currently exploited fish production from these waters is of the order of 21,000 tonnes, 80% which is being realised from the estuaries and brackish waters.

Capture fisheries

The capture fishery is carried out by a variety of fixed as well as free gears. Among the fixed gears, the important ones are the Stake nets, Chinese dip nets and filter nets. Free gears are the gill nets, cast nets, drag nets, Pachil Chengadom and hook and lines.

Medium and small dug-out canoes are the principal crafts employed for fishing. No reliable statistics of the number of gears in operation at present in the estuaries and backwaters of Kerala are available. Table-4 furnishes the number of different types of gears licenced by the Department of Fisheries during 1975-76.

Table 4 - Details of nets licenced by the Department of Fisheries during 1975-76

District	Chinese nets	Stake nets	Free nets
Trivandrum	1	7	234
Quilon	88	873	406
Alleppey	282	1508	2335
Idukki	-	-	-
Ernakulam	1082	3116	682
Trichur	42	401	41
Palghat	-	-	-
Malapuram	-	28	-
Kozhikode	-	127	-
Cannanore	-	-	-
Kottayam	90	869	560
Total	1991	7725	4258

The annual fish production from the estuaries and backwaters of Kerala has been found to fluctuate between 14,000 tonnes and 17,000 tonnes during the last few years. The major groups supporting the fishery are prawns (60-70%) mullets (11%), pearl spot (10%), cat fishes (9%) and other fishes, such as clupeoids, threadfins, perches and crabs. Among molluscs, clams of the genera Villorita and Meretrix contribute to the bulk of the fishery.

Among prawns, 4 species of penaeid prawns, namely, Penaeus indicus, Metapenaeus dobsoni, M. affinis and M. monoceros, and 2 species of palaemonid prawns, Macrobrachium rosenbergii and M. idella are important from the point of view of commercial fishery. The penaeid prawn fishery is contributed by the juveniles of the above species while the palaemonid fishery by the adults. In the annual prawn catch, M. dobsoni contributes to about 79%, M. monoceros 11.8%, M. affinis 2% and P. indicus 6.5%. Prawns are caught by the stake nets, gill nets, drag nets, chinese dip nets, cast nets, and Pachil Chengadom. The average annual catch of prawns during the last five year period has been of the order of 3722 tonnes.

Mullets are the next important group of fish caught from this region. Their average annual catch is estimated at 2136 tonnes. They are mainly caught by the stake nets, gill nets, seine nets and cast nets. The average annual catch of pearl spot and catfishes is 1894 and 1377 tonnes respectively. Most of the fish catch except that of prawn are marketed fresh and utilised for local consumption. However, the surplus catch is salted or semidried. Most of the prawn catch is processed and exported.

Upto the end of the sixties, the Pampa river system and low saline regions of the Vembanad lake were supporting lucrative fishery for the giant fresh water prawn, M. rosenbergii. The average annual catch of this prawn during that period was of the order of about 400 tonnes. However, the increasing fishing pressure particularly for the juveniles, and the suspected effect of pesticides used for paddy and leached out into the river system adversely affected the resource relegating the fishing into an insignificant proportion. There is an

urgent need to revive the fishing through appropriate measures. Besides prawn and fishes, a large quantity of live clams at an estimated rate of 88,000 t are also taken from this region.

Culture fisheries

Brackishwater fish culture is practised on a commercial scale at present only in central Kerala. This is an age-old avocation carried out in the low-lying fields adjoining the backwaters. The practice entails cultivation of a special variety of paddy called 'Pokkali' during the monsoon months when the water conditions in the field become almost freshwater. After the harvest of paddy in September/October, the fields are prepared for prawn culture by strengthening the bunds and fixing the sluice gates. Incoming tidal currents which bring in young ones of prawns and fishes as well as other organisms are let into the fields through the sluice gates. The prawn and fish fry thus trapped in the fields are grown for a period of about 2 months. Escape of the trapped seed during the ebb tides is prevented by placing a bamboo screen in the mouth of the sluice gates. Fishing is carried out during seven to eight days on either side of the full moon and new moon periods by fixing a filter net to the sluice during the ebb-tide. Besides the seasonal fields, the pratice is also carried out in the pernnial fields throughout the year.

Table 5 gives the details of the licences issued by the Department of Fisheries, area utilised and the amount realised for prawn/fish culture in the paddy fields during 1975-76

Table 5 Details of prawn filtration from paddy fields during 1975-76

District	No. of licenses issued	Area (ha)	Amount collected Rs.
Alleppey	52	352.67	4223.25
Kottayam	15	167.43	2183.75
Ernakulam	894	4000.00	50569.72
Trichur	160	590.80	7518.65
Total:	1121	5116.90	64495.37

The average production of paddy from these fields has been found to be 1510 kg/ha and that of prawns (M. dobsoni 53.3%, P. indicus 42.5%, M. monoceros 3.5% and P. monodon 0.7%) 903 kg/ha. The average total income from paddy as well as prawns amounted to Rs.4278/ha during 1969-72, the share of prawns alone being Rs.2996/ha. The average maintenance and operational expenditure was estimated at Rs.2847. The yield of prawns from the perennial fields is of the order of 806.5 kg/ha.

SMALL-SCALE MARINE FISHERIES OF TAMILNADU

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INTRODUCTION

There is no precise definition of "small-scale fisheries" . In the case of small scale industries, Rs. 10.0 lakhs investment is the ceiling. "Traditional Fisheries" will certainly be deemed to be part of small scale fisheries. Possibly fishing with boats of size upto 43½ ft. will also belong to small scale fisheries. But the F.A.O. reports on small scale fisheries refer only to improvements in traditional craft and their "motorization" butnot "mechanization".

MARINE FISHERY RESOURCES OF TAMILNADU

This State has a coastline of 1000 km with a continental shelf area of 41,500 sq.km. The"inshore" area (20 m depth) is 16,000 km. The Wadge Bank, in the south-west coast is 13,500 sq.km. in area and has a potential of 25,000 tonnes of fishes of high quality. With the declaration of "Exclusive Economic zone" in 1976, the exclusive fishing area of India is about 2 million sq.km. or 40% of its land area and

Tamilnadu gets 16% of the Exclusive Economic Zone. This zone in India may support 4.5 million tonnes of fish.

There are 3.9 lakh fishermen distributed in over 300 hamlets. Fishing is the principal occupation, generating income in rural areas and providing employment to rural population.

The potential catch of shelf region of Tamilnadu is estimated to be 8,79,920 t (Choodamani, 1972). Information on the offshore pelagic and demersal resources of Tamilnadu is inadequate. The major exploited groups of fishes are the sardines, anchovies and mackerelamong the pelagic group and sharks, sciaenids, perches and silver bellies among the demersal. It has been estimated that the pelagic resources in the Gulf of Mannar is 5 lakh t. consisting of anchovies, sardines,etc. The demersal fishes such as silver bellies perches and sciaenids and the cephalopods constitute over 2.85 lakh t. In the inshore area of the lower east coast, the potential is 4.8 lakh t. consisting of whitebaits, ribbon fish, silver bellies and sardines.

The offshore waters can provide 2 lakh t. of fishes constituted by perches, whitebait, deep-sea lobsters and prawns. The Exclusive Economic Zone of Tamilnadu would support 5.3 lakh t. of fish of which the region upto 200 m. would support 3.53 lakh t.

The above data indicate that the potential for fishing in the inshore and offshore areas off Tamil Nadu is appreciable. The survey done by Indo-Norwegian Project in the Gulf of Mannar reveals the availability in good quantities of redsnappers, 'Kalava' horse mackerels and sharks between 24-32 fathoms. Shoals of sardines and mackerels also occur in

this zone. Large quantities of deep-sea lobsters and prawns are available between 150 to 300 fathoms (Krishnamoorthy, 1972).

FISHING CRAFTS

Tamilnadu has 42,000 "traditional" country crafts (34,000 catamarans and 8,000 vallams) and a little over 2000 mechanized boats. These traditional crafts land about 135,000 t of fish (i.e. 60% of total landings of Tamilnadu). Also the bulk of better quality fish is landed by the traditional crafts. It is interesting to note that even in a very advanced country like Japan, 50% of fishing crafts are of the "traditional" type. Though mechanization programme was initiated in 1955 and it was intended to replace the traditional crafts, the results achieved were a mere addition of 2000 mechanized boats in 20 years as against 17,000 of traditional crafts added in 5 years. The traditional crafts operate within a limited range of 20 m or 20 km from the shore. Manual winches are used in 9.1 m boats, but 9.8 m boats have power take off and winch. Anchovies, sardines and mackerel require only vessels in the range of small purseseiners.

Since anchorage and harbour facilities are still lacking, small and light mechanized beach-landing crafts (surf boats) have vast scope in Tamilnadu.

PLANS FOR THE DEVELOPMENT OF SMALL-SCALE FISHERIES

The sub-group on Fisheries in VIth Plan of the Government of India has remarked that "traditional craft could continue to contribute to National economy". Increase in size and range of operation of traditional crafts is warranted. Mechanization of

traditional crafts using inboard and outboard engines of low H.P. and deck machinery should be pursued. More of small mechanized boats in areas which have remained comparatively unexploited and less number of small vessels where intensive fishing has taken place is suggested. The NCST gave priority for improvement of traditional fishing and mechanization of coastal fishing. It recomends assistance to mechanized fishing by small boat. 15% of outlay on Marine Fisheries is to be given to the traditional sector.

Mechanization of catamarans has been suggested and trials were made in Muttom with 18 HP outboard engines which were reported to be successful but uneconomical. 10 HP engine was later preferred. It has been suggested that Tamilnadu should concentrate on small boats capable of being beached and go in for smaller 25' boats with 30 HP engines (Krishnamoorthy, 1972).

During the VIth Plan period, it is proposed to motorize 3400 catamarans with outboard engines, as also 800 vallams. A subsidy of 50% on outboard engines and 25% on nylon nets for these traditional crafts has been recommended. Both, the traditional crafts and mechanized boats compete with one another in the narrow inshore belt for prawns, neglecting fin fish, leading to conflicts.

Light weight beach-landing crafts with inboard engines is preferable to catamaran with outboard engine. "Doris" type boats (20') tried in Tamilnadu will also be useful and must given extensive trials.

Small F.R.P. (Fibreglass Reinforced Plastic) boats which proved successful in Sri Lanka are also proposed to be introduced in Tamilnadu during the Sixth Plan. These may be supplied to fishermen owning traditional craft, with a subsidy of 33⅓%. The boat (mechanized) may cost Rs.20,000/- each.

To assist the traditional crafts and catamarans, tow vessels may be operated. Preservation of timber used for catamarans, supply of sail cloth of improved material, supply of manual winches for having shore seines may also be necessary to assist traditional fisheries.

The objective of improving the operational efficiency of traditional sector will be aided by supply of sophisticated and modern gear to enable them to land more fish. Rs.20.00 lakhs has been provided for this in the VIth Plan.

DIVERSIFICATION OF FISHING

With the prawn boom in full swing, the entire inshore belt less than 50 m depth and within 20 km from shore, is being swept both by traditional boats and mechanized boats, leading to cutthroat competitive fishing and consequent conflicts. Quite possibly the "law of diminishing returns" will soon operate in Tamilnadu coast also, as has happened already in Kerala coast. The entire fleet of 2000 mechanized boats are fishing only for prawns. The Governments assistance and support for this mechanization programme has helped a handful of lucky fishermen to become rich while most of them remain below the poverty line (F.A.O., 1978). Even in Kerala, it is said that out of 2000 mechanized boats, hardly 25 are engaged in pelagic fishing (Joseph, 1973). In contrast, in Orissa, 200 out of

650 mechanized boats are gillnetters (F.A.O.,1977). The sub-group on Fisheries of Central Planning Commission remarked - "there is an urgent need for diversified fishing activities from small mechanized boats".

The prawn catches of Tamilnadu, have increased from 5300 t in 1966 to 12,000 t in 1975. It is reported that, at best, only an additional 2350 t of prawns can be had from our coast. If it is over-exploited, the size and total landings will diminish resulting in lower prices and lower profits. The pelagic fishery resources off Tamilnadu estimated at 2.5 lakh t has not been fully exploited whereas the demersal resources exploited amount to 85,000 t (F.A.O., 1978). During 1975-76, nearly 30,000 catamarans caught 1.1 lakh t of sardines, mackerel and ribbon fish, using gill nets and drift nets. 7000 canoes, using longlines, drift nets,etc. caught 25,000 t of perches, sharks and rays and catfish.

Only by diversification we can fully and judiciously exploit the near shore and offshore fisheries. Trap fishing with 43½ (72.5 BHP engine) will give optimum results. Using the same sized boat Karnataka has achieved great success in purse seining. Purse seining has also been successful in Goa. This is a pointer to other States. Smaller sized FRP gillnetters will be very useful. These are available in sizes of 15' & 16' (10 HP outboard motor) 20' (15-20 HP outboard motor) and 38' (mechanized) These are being widely used in Sri Lanka. Gillnetters of 25' and purse-seiner/gill netters of 43' size may be used to exploit pelagic resources.

36' vessel is considered to be the smallest sized vessel for purse seining for economic operation and the ideal size is from 36' to 57', the latter for offshore fishing with sonar and echo sounder. A 36' trawler can be converted into a purse seiner. 17.5 m. or lesser sized purse seiners are used to fish anchovies and sardines.

Midwater or columnar fishes remain unexploited. Best priced fishes such as seer, pomfret and Indian salmon are in this zone. Midwater trawling for these would be profitable. The sub-group on Fisheries of Central Planning Commission also suggested introduction of purse seining and midwater trawling by 36' - 45' vessels, and also suggested more than one type of gear in mechanized boats.

Deep-water prawns and lobsters are available on the South-east and South-west coasts and could be fished by large sized vessels such as 70' boat (400 BHP). The Integrated Fisheries Project has recommended midwater trawling for Anchoviella using 57' boat (230 BHP engine).

Longlining and bottom set nets would be used to exploit the sharks, rays and perches and jew fish, In Bangladesh, traditional boats of size 12 to 14 m. (15 - 33 HP engines) are being used for gill netting (FAO ,1977). In Sri Lanka also, the most important gear is the gill net (FAO., 1977).

ECONOMICS OF VARIOUS TYPES OF CRAFT

The greatest asset of traditional craft is that there is no question of hike in operational expenses at any time since it is based on man power only. Small-scale fisheries using small boats with inboard or out-board engines have to incur operational expenses, especially on fuel and maintenance.

In Sri Lanka, a 3½ t. boat landed 18.5 t. of fish per boat per year. A motorized (outboard) craft landed 7 t/yr/boat. The National Commission on Agriculture has stated that a non-mechanized boat lands about 6 t/yr while a mechanized boat lands about 30 t/yr. The profit-ability of the latter is said to be 14%. Very interesting studies on the economics of different fishing vessels were made by AFC Ltd, Bombay. It was reported that an 82' vessel will incur a loss of Rs.1,86,000/yr. "Klaus Sunnana",the I.N.P. boat (19.81 m.) was incurring a loss of Rs.8.19 lakh/yr. The I.F.P. has recorded that a 43½' vessel doing purse-seining and trap fishing fetched a net profit of Rs.1.12 lakh/yr.

In Tamilnadu, a catamaran lands an average of 5 t/yr. and the sailing canoes land 20 t/yr. The mechanized boats catch fish as indicated below (State Planning Commission, 1972):-

9.1 m.	- 50 t/yr.
9.8 m.	- 80 t/yr.
13.8 m.	- 170 t/yr.
17.5 m.	- 500 t/yr.

For gillnetting, lighter vessels with minimum horsepower alone will be economical (Balasubramanyan, 1972). By investing Rs.1.2 lakhs in a 9.1 m. boat, a net profit of Rs. 25,000/-per year can be had (Choodamani, 1973).

The economics of F.R.P. boats has been worked out in detail by Unni (1978). According to him the profitability of small, FRP boat of sizes 15', 16' and 20' is 37.3%, 36.3% and 42.2% respectively, for an investment of Rs.41,950, Rs.47,500 and Rs.58,950 respectively (including engine and gear). Gokhale (1978) made a detailed analysis of the operation of boats and points out that the larger imported vessels were less efficient and less economical than the smaller indigenous mechanised boats. For example, the Polish vessel,"Muraena" brought a catch of 0.3 kg/HP/hr. while the all-India average was 0.8 kg/HP/hr. He stated that for the cost of one 400 HP imported trawler we can have 10 numbers of indigenous mechanized boats getting twice the catch of the former. He addes that the big imported trawler gives direct employment to only 10 persons (indirect nil) whereas the 10 indigenous provide direct employment to 60 persons and indirect employment to 90 persons (including in the boat building yard). The return per unit investment of non-powered boats is twice that of the powered boats and generates almost seven times direct employment than mechanized boat.

"The justification for expanding and strengthening artisanal fisheries lies in social benefits accruing to the stability of rural population" (F.A.O., 1978).

FINANCING SMALL-SCALE FISHERIES

The Principal objectives of financial assistance in developing Countries are related to welfare of fishermen, improving the economic condition of the fishermen and nutritional levels of the population.

The emphasis on large boats (imported) is because of the easy availability of finance from local and external agencies (F.A.O., 1972). Very little assistance was forthcoming for artisanal fishermen. Some nationalized Banks have now ventured to finance the small-scale fishery upto 75%. The N.C.S.T. (1973) also recommended assistance to traditional fisheries.

Credit assistance should be provided in the following fields: 1) introduction of imporved fishing vessels: 2) improved transportation of fish; 3) establish shore facilities, processing complexes, etc,, 4) imporved marketing; and 5) elimination of debts.

In the VIth Plan, the Government of Tamilnadu will be assisting the traditional fishermen in a big way. Banks must also assist the programmes massively by liberal loans to motorize the traditional craft. Instead of giving huge loans to a few big boat operators, a large number of small boat operators may be assisted, thus improving the economy of persons on the borderline of poverty.

The Agriculture Refinance Development Corporation refinanced the loans for two Cooperative Federations for buying and operating boats. The National Coop. Development Corporation is very eager to assist any fish production programme through cooperative organizations. Primary

Societies and Federations may, therefore, avail themselves of this source of firance and pass on the benefit to their members. These Cooperatives can operate fleets for fishing. Differential rate of interst for artisanal fisheries will help to lift this segment from the bottom of economic ladder. The SIPCOT has shown interest in financing projects for the manufacture of marine engines, freezing plant, fleet operation, etc. (Ramanathan, 1973).

PRESERVATION OF THE CATCH

In small-scale fisheries, because of the smallness of fishing craft, facilities for preserving the catch on board are lacking. In larger vessels adequate space for carrying ice and storage of iced fish are available. Small insulated boxes sutiably designed are proposed to be supplied to catamarans and 'vallams'. In the VIth Plan period such boxes will be supplied and a provision of Rs.10.00 lakhs has been made for this. So also for the small F.R.P. boats to be issued, the insulated box will be fitted in the boat itself. A total number of 1300 country crafts and 2000 FRP boats will be given such boxes. The main thrust in the coastal fishing sector should be to improve the handling, storage and utilization aspects of the catch.

Ice Plants are needed at strategic points to provide ice to the traditional and small mechanized crafts. Since small ice plants are not economical, supply of ice through mobile insulated ice vans in important fishing centres may be considered, especially to assist small scale fisheries.

SERVICE SCHEMES

a) Housing:

So far over 6500 houses have been provided for the fishermen. 1500 houses are under construction. A yearly allotment of Rs. 100 lakhs is being made to house the marine fishermen in stages.

b) Roads:

So far about 47 villages have been provided with link roads. In the VIth Plan, Rs.200 lakhs have been alloted to provide roads to a majority of 160 link roads needed for the rapid transport of fish from landing centres to the hinterland.

c) Guidelights:

These navigational aids are essential and during the next Plan period 15 fishing centres will be provided with such guidelights.

SMALL-SCALE MARINE FISHERIES AND RURAL DEVELOPMENT

Marine small-scale fisheries (artisanal or traditional fisheries) is essentially based in sub-rural areas called fishing"Kuppams" (hamlets). Generation of employment and income is therefore mainly at the rural level. This production is utilized to generate further employment in processing, marketing, transport,etc. Even now fishermen are engaged in marketing in some form or the other (auctioning or vending). Additional income could be had by making all the fishing requisites, mainly nets, at the making of which the fisherwomen are adepts. The bye-catches(trash fish) could also be processed in the

village itself to be made into fish meal which could be used to raise the village poultry units. It has been shown that appropriate technology is available for this as well as for making animal feeds by ensilaging fish or fish wastes.

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PRESENT STATUS OF SMALL-SCALE FISHERIES IN PONDICHERRY

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The Union Territory of Pondicherry, comprises of four maritime regions viz., Pondicherry, Karaikal, Mahe and Yenam covering a coastal line of about 45 km with 675 sq.km of inshore waters. The marine fisheries were not exploited properly during the Ex-French regime, even though fish is readily consumed by the people. The annual fish production was estimated at 900 tonnes before the transfer of these regions to the Indian Union.

DEVELOPMENT PROGRAMMES DURING THE PLAN PERIOD

The Department of Fisheries was newly created in the Union Territory of Pondicherry in November, 1954. The Office of the Director of Fisheries was established in November 1955, with a strength of one Gazetted Officer as Director of Fisheries and one Inspector of Fisheries in each region of the Union Territory. With the help of the technical staff of the Fisheries Department, necessary data on fishery resources was collected, and the Five Year Plan development schemes were formulated to improve the socio-economic conditions of the fishermen.

During the last year of the First Five Year Plan a sum of Rs.30,000/- was spent on the organisational matters and development of marine and Inland fishery resources. In the Second Five Year Plan, schemes costing Rs.5.31 lakhs were implemented and the fishermen were supplied with 500 kgs of synthetic

fish net twine at subsidised cost. In order to enable the fishermen to cure the fish under hygienic conditions, a departmental fish curing yard was established at Mahe and salt was supplied to them 20% subsidised cost. The department hired out 2 motor vans for quick transport of fresh fish from landing centres to marketing places at reasonable hire charges. The fish production had increased to 4500 tonnes at the end of Second Five Year Plan period by implementing the above schemes successfully. During the Third Five Year Plan, the scope of the schemes was widened and more quantity of synthetic nylon twine was distributed at subsidised cost to replace the cotton and hemp nets. Ice Plant-cum-Cold Storage Units in marketing centres were established to preserve the surplus catches and unsold fish to prevent spoilage and more numbers of vehicles were hired out for the transport of fresh fish from the landing centres to markets. A total amount of Rs.15.24 lakhs was spent during the Third Five Year Plan period and as a result the fish production increased to 9,000 tonnes.

During the succeeding three Annual Plan, the various development schemes initiated in the previous Plans were implemented successfully from the year 1966 to 1969 at a total cost of Rs.19.29 lakhs. The Fourth Five Year Plan schemes were formulated with a total outlay of Rs.85.00 lakhs to augment the fish production from 9000 tonnes to 15000 tonnes imparting training to fishermen in modern methods of mechanised fishing, supply of modern fishing gear, affording loans at low interest through Fishermen Co-operative Socieities for the purchase of essential fishery requisites, provision of facilities for landing of fish, storage, marketing, curing, quick transport etc. In order to preserve the surplus catches, two-ton ice and five-ton storage unit was installed in Pondicherry and one-ton ice and two-ton cold storage unit at Karaikal. Credit facilities at nominal rate of interest were afforded and essential fishery requisites were also supplied at subsidised rate through 25 primary Fishermen Co-operative Societies and one Fishermen Co-operative Federation set up for the benefit of fishermen community.

Considering the problem of the shortage of housing facilities in this Territory, a housing scheme for fishermen was taken up for implementation during the IV Plan period by granting financial assistance of Rs.2,000/- per house of which 75% was subsidy and 25% interest-free loan. The pattern of assistance has since been revised and the total amount has been raised from Rs.2,000/- to Rs.3,700/- the ratio of loan and subsidy remaining the same. So far, 815 houses have been constructed. With the object of providing hygienic fish markets, it is proposed to grant 75% subsidy and 25% loan to local bodies for improving/remodelling the existing fish markets. So far 6markets have been constructed under this scheme. The funds spent on development schemes from the inception of Fisheries Department till date are furnished below:

Year	Funds allotted (Rs. in lakhs)	Year	Funds allotted (Rs. in lakhs)
1955-1960-61	5.42	1970-71	22.35
1961-62	1.05	1971-72	18.45
1962-63	1.18	1972-73	24.55
1963-64	3.02	1973-74	17.81
1964-65	1.9	1974-75	25.06
1965-66	7.01	1975-76	44.26
1966-67	6.35	1976-77	37.88
1967-68	6.00	1977-78	33.00
1968-69	6.93	1978-79	30.00
1969-70	13.40		

As approved by the Government of India, Periaveerampattinam and Chinnaveerampattinam fishing villages have been selected under the centrally sponsored scheme viz., "Infrastructural facilities to Coastal Fishing villages", and the scheme will be implemented from April, 1978 onwards. Necessary steps were taken up to provide approach roads, water supply, community hall, flake ice plant, children park, fish curing yard, drying platform, landing platform, auction hall, public latrines and bathrooms

for fishermen population of the villages. Under the assistance of MPEDA, Cochin one fish landing platform is being constructed at a cost of Rs.40,000/- at Karaikal.

FISHERY RESOURCES

All the four maritime regions of Pondicherry cover a coastline of about 45 km with 575 sq. km of inshore waters which offer immense scope for the development of marine fisheries. The Continental Shelf area is 1424.70 sq.km. Average distance to the Continental Shelf margin is 25 km The inshore water area is about 569.80 sq.km at Pondicherry, 841.95 sq.km at Karaikal and 12.95 sq.km at Mahe. The Union Territory of Pondicherry supports a sizable fishermen population of 29,000 scattered over 27 marine fishing villages with more than about 2353 indigenous fishing crafts called catamaran and 218 country boats with about 10,000 fishing gears. The peak fishing season starts from January and ends in June and the varieties of fish caught during various seasons are given below:

January: Ribbon fish, horse mackerel, Lactarius, seer fish, jew fish and prawns.

Feburary: Mullets, ribbon fish, sabre fish, horse mackerel, white bait.

March: White bait, sardines, ribbon fish, horse mackerel, jew fish.

April: Sardines, white bait, Lactarius, pomfret, jew fish

May: Sardines, white bait, pomfret, jew fish, flying fish.

June: Flying fish, pomfret, horse mackerel, mullets, jew fish.

July: Sardines, ribbon fish, mackerel, mullets, Lactarius, prawns.

August: Jew fish, mullets, horse mackerel, shark, sabre fish, flying fish.

September: Shark, jew fish, sardines, anchovies, silverbellies, prawns.

October: Ribbon fish, jew fish, mullets, prawns, white bait, Lactarius,.

November: Sabre fish, mullets, prawns, jew fish, Lactarius.

December: Silverbellies, cat-fish, mullets, Lactarius, prawns.

Fish production in the Union Territory during the last four years is given below:

Year	Marine (000 tonnes)	Inland
1974-75	21.7	0.6
1975-76	13.3	0.5
1976-77	1211	0.4
1977-78	11.2	0.6

CRAFT AND GEAR

Crafts

The fishing crafts and gears of Pondicherry are mainly of indigenous nature designed to suit local conditions. In the East Coast the sea is rough and the surf breaks heavily upon the coast throughout the year. The crafts used are chiefly the non-rigid 'Catamarans' and 'Masula Boats'. Nets and other implements have been so designed as to capture particular varieties of fishes. A brief description of each craft and gear is given below:

Catamaran:

It is the most prominent fishing craft of this region. The catamaran is a keelless craft formed by lashing together 3 to 7 or 8 logs. The logs are cut square on one edge and curved into a rough cone at the other. The conical end rises slightly above the general level of the raft and forms the stern of the catamaran. The Catamaran logs are

purchased from private merchants and Fisheries Co-operative Societies who import logs, previously from Sri Lanka and now from Kerala. Mostly Lune medulla and Albezzia logs are utilised for the catamaran and the cost of each set varies from Rs.500 to 2000/-. There are various sub types. Special mention may be made of 'Kola Maram' or "flying fish catamaran" used in this coast to go 30 to 35 kilometres from the shore for catching flying fish exclusively during June to August. It consists of 7 logs with an accessory one lashed from the starboard and costs about Rs.2500/-.

Masula Boats:

This boat is much employed for fishing with shore seine nets. This is a non-rigid boat constructed with "Aiyini" (Artocarpus hirsuta) planks only without ribs or frames so as to stand the severe knocking of the surf. The planks are sewn together with coir rope and the inter spaces between the planks are filled up with dry straw. The cost of the masula boat ranges from Rs.3500 to 5000/-.

Odam:

It is a large sized dug out canoe measuring about 9.75 m in length, 0.91 m wide and 0.76 m deep. It is made by scooping out material from a large trunk. The keel portion is left thicker than the sides.

Thonies:

It is comparatively smaller dug out measuring about 7.31 m in length; 0.91 m broad and 0.45 m depth. It is chiefly used for conducting drift and gill net operations.

Nava Boat:

It is predominantly used in and around Vanam area. It is also built of wooden planks with strong ribs. It is about 7.62 m to 10.6 m in length. It has mast and sail for propulsion. It is engaged in sea fishing for operating gill nets.

Shoe dhoni:

It is popular in Yanam area. It is made of teak wood and is about 5.4 m to 6.7 m in length. It has got the shape of a shoe and used for operating gill nets and entangling nets.

Gear

Though the indigenous fishing implements are of various types, they can be conveniently classified under some broad groups. The nets are mostly made of cotton / The nets are mended by hand and are commonly preserved by treating them with the bark decotion or by starching. Some important types of nets under each group are briefly described below:

Bag nets and Boat seines: "Thuri valai" (Vella valai) is a primitive trawl net operated from two catamarans in waters 4-6 fathoms deep. Demersal fish like cat-fish, rays and soles are caught. The mesh of the net is usually 12.7 mm near cod end and 63.5 mm in the wings.

"Edavalai" is a shallow bag net with a wide rectangular mouth having mesh size of 63.5 mm near the mouth. It is used along with lures, called "Kambi" consisting of strings of coconut leaves attached to a rope and moored in the sea. The net is operated in 6-8 fathoms and pelagic fish like pomfrets, sardines and mackerel are caught.

Shore seine: "Peria valai" contains a bag like cod end with two wings (halves) of about 18.3 m length and 10.6 to 13.71 m breadth and long wings 700 m inlength. The net is short near the surf beaten shore from a padagu (Masula boat) in about 1-2 fathoms. Shoaling fish like sardines mackerel, anchovies, cat fish, Caranx and prawns are hauled.

Drift nets and gill nets: These are wall-like nets either made of hemp or cotton and now-a-days of synthetic twine or various sizes and meshes. The material, mesh and size differ according to the type of fish caught. Generally wooden floats (now replaced by synthetic floats) and

/and hemp and long lines used for sea fishing are .. 8 ..
made of cotton.

some sinkers are attached to the foot rope of the net. Drift nets are generally intended to catch big varieties of fish and are therefore made of strong material with large mesh. Gill nets are generally made of comparatively smaller meshes. The cost of the above nets ranges from 1500 to 2500 per piece depending upon the size, material used for webbing etc. The local names of these types of nets are as follows: Vala valai, Thadachivalai, Kavala valai and pachu valai or Irugavalai.

Long lines: Long line consists of a special form of set line made of twisted cotton yarn. They are sufficiently longer in length and provided at regular intervals with thinner branch lines called snoods to which innumerable hooks are attached. The long line is made to suspend horizontally in mid water or at required depth by attaching the line to vertical supporting ropes with anchored buoys. The line is periodically hauled up to collect fish.

Hand lines are mostly made of nylon monofilament. They are operated by individual fishermen in inshore waters from anchored catamarans. It consists of a simple vertical line to which lead or iron net is attached for casting the line into the sea far away. To each line is attached two or more hooks by means of snoods. A fisherman will operate 2 or 3 hand lines at a time. Small sharks, perches and other miscellaneous fish are caught.

Fishermen generally using traditional crafts and gear are engaged in fishing at a distance of 2 to 8 km from the shore. In the flying fish fishery the range extends upto 35 to 45 km.

Fishing without gear: In Pondicherry and Karaikal regions, Sunnambar estuary and Arikankuppam estuary have abundant bivalve shells locally called as Matti. They are collected by hand picking and the shells are processed in kilns for manufacturing lime which is used for white washing. The fishery right for the shells are vested with the respective Commune Panchayts.

INFRASTRUCTURE

Berthing facilities: Under the Centrally sponsored scheme "Improvements to minor fishing Harbours", landing and berthing facilities for the mechanised boats are made available. A fish landing jetty for Karaikal region was constructed prior to the IV Plan period and another fish landing jetty was constructed at Mahe during 1971-72. About 15 to 30 nos. of 30' boats can be anchored safely along the above mentioned jetties. At present no landing facilities are available in Pondicherry and all the fish which are caught by the fishermen are landed in the sea adjacent to their respective fishing villages. The catches are brought to the shore by catamarans.

Preservation and processing: Most of the catches are sold a fresh for consumption by the public. Excess fish is preserved only when the catches cannot be disposedoff in fresh condition which may work out 1/5th of the total catches. The Ice Plan-cum-Cold Storage Plant at Pondicherry, having 2 tons ice and 5 tons storage capacity was constructed at a total cost of Rs.1.78 lakhs in the year 1967. Ice is sold out to the fish merchants at subsidised rates. An Ice Plant cum-Cold Storage Unit is functioning in Karaikal.

There is only one fish curing yard at Mahe. The fishermen are therefore curing fish in their respective villages and the cured fishes are transported to interior markets by lorries, fish vans and by carts. Pure salt is distributed to the fishermen for curing at the fish curing yard at Mahe at subsidised rate.

Marketing: The fish is auctioned with or without the help of fish auctioners who take a commission for their services. The distribution of most of the fresh fish to interior villages is done by cyclists and to the big markets by fish vans and to the nearest places by head lods.

Boat building: No Government boat building yard exists in Pondicherry, but private parties have established boat building yards, one at Kanniakoil in Pondicherry region with the financial assistance of FIPPIC and another at Karaikal which manufactures boat hulls for the Department & private individuals.

SOCIO ECONOMICS

There are 16 marine fishing villages along the Coast of Pondicherry, 10 at Karaikal and one each at Mahe and Yanam. The details of the Villages are furnished below:

Pondicherry: Kanagachettikulam, Periyakalapet, Chinnakalapet, Pillaichavadikuppam, Solaithandavankuppam, Vaithikuppam, Kuruchikuppam, Vambakeerapalayam, Thuppirayapet, Veerampattinam, Chinna Veerampattinam, Pudukuppam, Nallavadu, Pannithittu, Narambai and Moorthikuppam-Pudukuppam; Karaikal: Mandapatheer, Kalikuppam, Akkampetti, Keelakasakudi medu, Kottucherry-medu, Kilinjalmedu, Karaikalmedu, Karukkalacherry, T.R. Pattinam and Keelavanjoor; Mahe: Mahe; Yanam: Guerimpeta.

Some of the above mentioned fishing villages are not connected by approach roads.

There are about 14,333 fishermen living in Pondicherry region and 6,555 at Karaikal and 924 at Yanam and 3515 at Mahe. In these areas, there are about 7425 fishermen who are engaged in full time fishing, about 2927 persons engaged on partime basis and 560 as occasional fishermen.

Unlike in other regions of Pondicherry, Mahe which lies in the West coast is having a separate system of ownership of the craft and employment of fishermen. The major craft used is big odams, ie., dug out canoes which employ 8 fishermen per boat to operate large seine nets. Here the system is catch and share basis. The boat owner receives [illegible] of the catch as his share and the rest is divided equally among the sixteen employed for

operating the nets. Of late groups of fishermen jointly own fishing units through Bank assistance etc., and sharing the catches equally. In Pondicherry region, the fishermen are getting 50% share out of the catches, and the rest 50% goes to the owner of the net and catamaran. And also among the fishermen of Pondicherry and Karaikal, a portion of the catch is set apart for the common good funds of the villages. The above amount is utilised for the benefit of the fishermen during non-fishing season, festival, distress etc. The average daily income of the fishermen ranges from Rs.5 to 10/-.

The socio-economic conditions of the fishermen is yet to improve, especially due to the exploitation of middle men in marketing the catches landed. Generally the thrift mentality is found lacking among the fishermen and they spend whatever they earn on the same day.

DEVELOPMENT PLAN

Plan Schemes:

The Department of Fisheries of Pondicherry has taken up the following 14 schemes for the development of Fish and Fisheries and socio-economic conditions of the fishermen community.

1. Fish Seed Farm: The object of the scheme is to set up fish seed farms, induced breeding centres etc. to meet the requirement of quality fish seed. Under the scheme so far 1 farm each at Pondicherry and Karaikal and 2 at Yanam are functioning.

During the year 1977-78, steps have been taken to set up one induced breeding Centre at Karaikal and complete the pending works of Sehour and Ousseudou lake nurseries. During the year 1977-78, 4.00 lakhs of fish seeds have been obtained.

During the year 1978-79, an amount of Rs.2.45 lakhs has been earmarked in the budget for the development of these centres.

2. Mechanisation of fishing boats: The object of the scheme is to increase the marine fish production by covering the inshore and deeper waters by means of mechanised fishing. So far 184 boats were distributed to fishermen. Owing to certain circumstances the second phase of the ARDC scheme could not be taken up for implementation. It is proposed to procure 8 Nos. of mechanised boats for distribution to Mahe and Yanam regions the areas which are not covered under ARDC scheme. The DGS & D approval for the direct purchases of 8 Nos. of marine diesel engines has been received. Under the above circumstances, the targets proposed under the scheme could not be achieved. However, the funds earmarked were utilised for the completion of 10 Nos. of boat hulls.

During 1978-79, it is proposed to revive the procurement of 35 Nos. of mechanised boats with institutional finance from ARDC, Bombay and financial assistance from State Bank of India, Pondicherry. It is also proposed to restrict the second phase of ARDC Scheme to the extent of 9 nos. of mechanised boats procured already during 1976-77. It is also proposed to revive the scheme of procurement of mechanised boats through the department owing to the reason that inordinate delay is caused in achieving the targets under the proposed scheme. One Patrol-cum-Rescue boat will be procured for conducting patrol and rescue operations. An amount of Rs.10.75 lakhs has been earmarked under this scheme.

3. Service-cum-Maintenance Units: The scheme aims to provide repair and servicing facilities to mechanised fishing boats and supply of spares by setting up of Service-cum-Maintenance Units. These units are at present working one each at Pondicherry, Karaikal and Mahe regions. During 1977-78 necessary spares required for the units were purchased. Construction of Building for Mahe unit has been taken up. An amount of Rs.0.959 lakhs has been spent.

4. Transport facilities: The object of the scheme is to provide quick transport facilities to fishermen for transporting their fish catches from

landing centres to the interior markets. The department is at present maintaining 8 fish vans.

5. Improvements to fish markets: With the object of providing hygienic fish markets, it is proposed to grant 75% subsidy and 25% loan to local bodies for improving/remodelling the existing fish markets. So far 4 markets were constructed under the scheme. During 1977-78 an amount of Rs.2.77 lakhs has been spent for the construction of 6 markets.

6. Setting up Ice plant-cum-Cold Storage: During the year 1978-79, the Yanam unit will be completed. Steps will be taken to set up one more unit at Mahe. A sum of Rs.2.00 lakhs has been provided for this purpose. During the year 1977-78, steps have been taken to construct one more Ice Plant at Yanam in addition to the existing ones at Pondicherry and Karaikkal. An amount of Rs.0.40 lakhs spent for the construction of the building.

7. Inshore Fishing Survey Station: The object of the scheme is to explore the fishing grounds in the inshore areas of the sea off this Union Territory and to locate rich fishing grounds to make the result available to fishermen for increased returns. The Inshore Fishing Survey Station is conducting survey off the coast of Pondicherry. During 1977-78, an amount of Rs.1.41 lakhs has been spent for the procurement of survey equipments and maintenance of boats. During 1978-79, the survey work will be extended to other regions. An outlay of Rs.1.50 lakhs has been earmarked under this scheme.

8. Training of Fishermen and Fisheries Personnel: The object of the scheme is to train more and more fishermen in modern methods of fishing. So far 300 fishermen have been trained under this scheme. During 1977-78, 14 fishermen were trained in advanced methods of fishing in the Fisheries Training Centre at Kakinada, Cuddalore and Nagapattinam. In addition, the 6 in-service personnel of this department have been deputed for various short term refresher courses. During 1978-79 steps have been taken to send

10 candidates each to Central Institute of Fisheries Nautical Engg. and Training, Cochin, Madras to undergo training in Engine Driver and Fishing Second-hand courses. Rs.1.00 lakh has been provided under this scheme.

9. Planning, Direction, Supervision, Publicity and Statistics: The aim of the scheme is to strengthen Fisheries Department by the appointment of requisite staff as well as to collect fishery statistics and conduct extension activities for the development of fisheries.

The Department of Fisheries has been strengthened with necessary staff. However the requirement of staff has since increased consequent of increasing volume of work out of the introduction of more boats and implementation of various schemes. During 1977-78, 2 posts of Deputy Director have been filled. Rs.0.50 lakh has been provided under this scheme.

10. Assistance to Fishermen Co-operative Societies: There are at present 32 Fishermen Co-operative Societies and one Apex Federation and one Marketing Union Functioning in this Union Territory for the betterment of fishermen community. During 1977-78 an amount of Rs.0.75 lakh has been granted in the form of cash loan and subsidy. Besides the above Rs.0.25 lakh has been granted as share capital contribution. During the year 1978-79, it is proposed to continue the scheme with an outlay of Rs.4.50 lakhs.

11. Supply of Fishery Requisites: In view of the high cost of fishery requisites, assistance is given to fishermen in the form of 20% subsidy. During the year 1978-79, fishery requisites work of Rs.1.25 lakhs were purchased and distributed to fishermen through Fishermen Co-operative Societies by the Karaikal Fishermen Co-operative Marketing Union, Karaikal and Pondicherry State Fishermen Co-operative Federation, Pondicherry. The scheme will be continued with an outlay of Rs.0.25 lakh on the same lines during the year 1978-79.

12. Housing for Fishermen The scheme aims at providing housing facilities to fishermen by granting 25% loan and 75% grant at the rate of Rs.3,700/- t. each beneficiary. So far 675 houses have been constructed under the scheme. During the year 1977-78, the Pondicherry State Housing Board has taken up the construction of fishermen colony consisting of 55 houses at Moorthikuppam - Pudukuppam. Besides the above, construction of 60 houses at Karaikal, 15 houses at Mahe and 10 houses at Yanam were taken up by the respective blocks. During 1978-79, the scheme will be continued with an outlay of Rs.3.02 lakhs. It is proposed to construct 205 houses under this scheme.

13. Development of infrastructural facilities in coastal fishing villages:

The object of the scheme is to provide essential infrastructural facilities in Periaveerampattinam and Chinnaveerampattinam fishing villages as approved by Government of India. The administrative sanction of the Govt. of India was received at the end of March 1977. Therefore the scheme was taken up for implementation from April 1978 onwards and steps were taken to provide approach roads, water supply, community building, Flake Ice Plant, Children Park, Fish Curing Yard, etc. During the year 1977-78, the construction work of community Building was taken up. During the year 1978-79, utilising the central grant, the scheme will be taken up and all the infrastructural facilities will be provided at a cost of Rs.2.96 lakhs.

14. Setting up of Fisheries Extension Unit: The object of the scheme is to set up a Fisheries Extension Unit at Pondicherry. During the year 1977-78 necessary proposals were submitted to local Governmment for onward transmissionto Government of India. The scheme has been dropped.

OTHER PROGRAMMES

The Department of Fisheries has taken steps for the establishment of the Fishing Harbour at Pondicherry and deepening of the river mouth of Mahe under the Centrally Sponsored Scheme "Improvement to Minor Fishing Harbours".

During 1977-78, the survey team from Pre-Investment Survey of Fishing Harbour, Bangalore, visited Pondicherry and conducted survey. The survey report is awaited to approach the Government of India for necessary action to set up a Fishing Harbour at Pondicherry. Likewise, the Government of India has been addressed by this Administration to accord sanction for incurring expenditure of Rs.0.80 lakhs for conducting geophysical survey in Mahe river by National Institute of Oceanography, Panaji, Goa. Government of India approval is still awaited.

Aid/Assistance: Whenever the fishermen are affected by cyclone, relief measures are taken by the Department and loan and subsidy are granted for the loss of catamarans, and net during the cyclone. A scheme has been formulated to grant aid upto Rs.5000/- for the loss of life, fishery requisites etc.

Education: Generally the fishermen population in Pondicherry is below the mark in the field of education. Lower Primary School, Upper Primary School, Middle School are functioning in almost all the villages. Pre-Schools are also functioning in some villages for giving nursery education between the age groups of 3 to 5. Facilities of High School Education and College Education are also available to them in the nearby towns.

Nutrition: Fishes are distributed to the pre school children through Balwadies at free of cost and pregnant women, expectant mothers are also supplied with fish on free of cost through Mathar Sanghams, under the Applied Nutrition Programme implemented by Block Agenices.

Extension: Extension activities are being implemented through Block Agencies. Audio visual Unit functioning at the office is regularly conducting film shows on fish and fisheries and the latest development on fisheries are also screened. Information like depth of the fishing grounds, types of fish available, nature of the sea bed and other related fisheries information gathered by the Inshore Fishing Survey

Station is conveyed to them through pamphlets and leaflets.

CONFLICTS, IF ANY BETWEEN TRADITIONAL FISHERIES AND MECHANISED FISHING OPERATION

Clashes have occurred between the mechanised fishing boats operators and country craft fishermen since the inception of the mechanised programmes. These disputes are noticed in Vaithikuppam and Pudukuppam during prawn fishing season. The main objections raised by the traditional fishermen are that, apart from they being deprived of catches of prawn and other fish from the coastal areas enjoyed by them in the past due to competition by more efficient mechanised boats, their costly nets are also frequently damaged by the trawling operation of the mechanised fishing boats. With a view to ensure that both the mechanised fishing boat operators and traditional fishermen go about their fishing without infringing on each other's rights, the Government has introduced a new clause in the rules framed for governing the allotment of mechanised fishing boats under the hire-purchase system and also a condition in the hire purchase agreement executed by the mechanised fishing boat hirers, whereby the mechanised fishing boats should not operate within a distance of <u>THREE miles</u> from the shore where traditional fishing crafts generally operate.

This three-mile limit has been well recognised by both the group of fishermen. This curbs the tendency of themechanised fishing boat operators to fish in the areas traditionally exploited by catamaran/country craft fishermen. A constant vigil has also been kept so as to avoid clashes.

AN AGREEMENT ON THE FOLLOWING LINES HAVE BEEN REACHED BY THE INTERVENTION OF THE GOVERNMENT

1. Mechanised boat owners should operate their boats at 7 fathoms or more in depth in between 6 A.M. and 6 P.M.

2. The mechanised boats should display the first two letters in legible letters denoting the name of the village and the boat number in bold letters conspicously over the boat.

3. Mechanised boats engaged in fishing during the stipulated hours should pay the compensation decided by the respective village panchayat in case of any damages caused to catamaran or nets by them during the course of fishing.

4. The compensation amount decided by the village Panchayat should be paid within three days of the decision taken.

5. There should not be any objections for the anchorage and fish landings of the boats in any of the fishing village of Union Territory of Pondicherry State.

6. The mechanised boats and catamarans should not be utilised for any purpose other than fishing.

7. Penalty of fine amount of Rs.500/- should be ~~given by the mechanised~~ boat owner levied by panchayatdar after enquiry, if he violates the agreement and conducted fishing below 7 fathoms depth from the shore.

8. The mechanised boats and catamarans should take their boat for fishing 90° east from the anchorage point in the sea upto 7 fathoms and beyond.

9. A clause may be inserted in the rules framed for governing allotment of mechanised Fishing boats under the hire purchase system and also a condition in the hire purchase agreement executed by the fishing boat hirers to the effect that the mechanised boats should not operate within 7 fathoms depth from the shore.

10. Conciliation Committees should be constituted in each region viz., Pondicherry, Karaikal, Mahe and Yanam. The conciliation Committees shall be represented by five representatives of each group of fishermen with the Deputy Director of Fisheries/Inspector of Fisheries

concerned and the chairman of the Committee. The Committee will rush to the spots wherever the clashes occur and settle the disputes then and there and decide the compensation to be paid by the mechanised boat operators to Catamaran/Country craft fishermen towards loss of nets etc.

11. The Police Department, Pondicherry shall arrange for a coastal patrolling and police pickets in all marine fishing villages of this Union Territory to avoid clashes and keep a vigilant watch to ensure that the mechanised boats keep to their side of fishing area. The State Police Department shall interfere whenever there is a clash on the high seas or in the fishing villages and treat the matter purely as a law and order problem.

12. An act may be passed to make the 7 fathom limit as a statutory one so as to ensure that the mechanised fishing boat operate only in 7 fathoms depth from the shore

Legilsation

The Acts and rules passed in the Union Territory of Pondicherry are given in Appendix I and II.

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APPENDIX I

THE INDIAN FISHERIES ACT, 1897
(ACT IV of 1897)

1. Title and Extent.

(1) This Act may be called THE INDIAN FISHERIES ACT, 1897.

(2) It extends to the whole of India except (The territories which immediately before the 1st November, 1958, were comprised within Part B States).

2. Act to be read as supplemental to other Fisheries Laws.

Subject to the provisions of Sections 8 and 10 of the General Clauses Act, 1887, this Act shall be read as supplemental to any other enactment for the time being in force relating to Fisheries in the territories to which this Act extends.

3. Definitions.

In this Act, unless there is anything repugnant in the subject or context -

(1) "fish" includes shell-fish
(2) "fixed engine" means any net, cage, trap or other contrivance for taking fish, fixed in the soil or made stationery in any other way; and
(3) "private water" means water which is the exclusive property of any person or in which any person has for the time being an exclusive right of fishery whether as owner, lessee or in any other capacity.

explanation:- Water shall not cease to be "private water" within the meaning of this definition by reason only that other persons may have custon right of fishery therein.

4. Destruction of fish by explosives in inland waters and on coasts.

(1) If any person uses any dynamite or other explosive substance in any water with intent thereby to catch or destroy any of the fish that may be therein, he shall be punishable with imprisonment for a term which may extend to two months, or with fine which may be extended to two hundred rupees.

(2) In sub-section (1) the word "water" includes the sea within a distance of one marine league of the sea coast; and an offence committed under that sub-section in such sea may be tried, punished and in all respects dealt with as if, it had been committed on the land abutting on such coast.

5. Destruction of fish by poisoning waters.

(1) If any person puts any poison, lime or noxious material into any water with intent thereby to catch or destroy any fish he shall be punishable with imprisonment for a term which may extend to two months, or with fine which may extend to two hundred rupees.

(2) The State Government may, by notification in the Official Gazette suspend the operation of this section in any specified area, and/in like manner modify or cancel any such notification.

6. Protection of fish in selected Waters by rules of State Government.

(1) The State Government may make rules for the purpose hereinafter in this section mentioned, and may by notification in the Official Gazette apply all or any of such rules to such waters, not being private waters, as the State Government may specify in the said notification.

(2) The State Government may also by like notification, apply such rules or any of them to any private water with the consent in writing of the owner thereof and of all persons having for the time being any exclusive right of fishery therein.

(3) Such rules may prohibit or regulate all or any of the following matters, that is to say:-

(a) the erection and use of fixed engines.
(b) the construction of wires; and
(c) the dimension and kind of the nets to be used and the modes of using them.

(4) Such rules may also prohibit all fishing in any specified water for a period of not exceeding two years.

(5) In making any rule under this section the State Government may (a) direct that the breach of it shall be punishable with fine which may extend to one hundred rupees, and, when the breach is a continuing breach, with a further fine which may extend to ten Rupees for every day after the date of the first conviction during which the breach is proved to have been persisted in; and

(b) provided for-

(i) the seizure, forfeiture and removal of fixed engines erected or used, or nets used, in contravention of the rule, and

(ii) the forfeiture of any fish taken by means of any such fixed engine or net.

(6) The power to make rules under this section is subject to the condition that they shall be made after previous publication.

(7) Arrest without warrant for offences under this Act.

(i) Any police officer, or other person specially empowered by the State Government.in this behalf, either by name or as holding any office, for the time being, may, without an order from a Magistrate and without warrant, arrest any person committing in this view any offence punishable under section 4 or 5 or under any rule under section 6.

(a) if the name and address of the person are unknown to him and

(b) if the person declines to give his name and address or if there is reason to doubt the accuracy of the name and address if given

(2) A person arrested under this Section may be detained until his name and address have been correctly ascertained.

Provided that no person so arrested shall be detained longer than may be necessary for bringing him before a Magistrate, except under the order of a Magistrate for his detention.

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APPENDIX II

THE INDIAN FISHERIES (PONDICHERRY AMENDMENT) ACT, 1965

(Act 18 of 1965) (5th November, 1965)

AN ACT

To amend the Indian Fisheries Act, 1897 in its application to the Union Territory of Pondicherry.

Preamble

WHEREAS it is expedient to amend the Indian Fisheries Act, 1897 (Central Act IV of 1897) in its application to the Union Territory of Pondicherry

BE it enacted by the Legislative Assembly in the Sixteenth Year of the Republic of India as follows:

Short tile, extent and commencement.

1. (1) This act may be called the Indian Fisheries (Pondicherry Amendment) Act, 1965.
(2) It extends to the whole of the Union Territory of Pondicherry.
(3) It shall come into force at once.
Ameendment of section 6, Central Act, IV of 1897.

2. In sub-section (3) of section 6 of the Indian Fisheries Act, 1897 (Central Act IV of 1897) (hereinafter referred to as the said Act.)

i) after the words "prohibit or regulate" the words "either permanently or for a time or for specified seasons only" shall be inserted, and
ii) for clause (c), the following clauseshall be substituted, namely,
"(c) the dimension and kind of the contrivances to be used for taking fish generally or any specified kind of fish and the modes of using such contrivances".

Amendment of Section 6, Central Act IV of 1897.

3. For sub-section (4) of section 6 of the said Act, the following sub-section shall be substituted, namely.

4. "Such rules may also prohibit all fishing in any specified water except under a lease or licence granted by Government and in accordance with such conditions as may be specified in such lease or licence."

Insertion of new Sub-section (7) to section 6, Central Act IV of 1897.

(4) After sub-section (6) of section 6 of the said Act, the following sub-section shall be inserted, namely;

"(7) All rules made under this Act shall, as soon as may be after they are made, be laid before the Legislative Assembly of Pondicherry while it is in sessionfor a total period of fourteen days, which may be comprised in one sessionor in two successive sessions, and, if before the expiry of the session in which it is so laid or the session immediately following, the Legislative

Assembly makes any modification in the rule or decides that any such rule should not be made, that rule shall thereafter have effect only in such modified form or be of no effect, as the case may be, so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule."

Insertion of new Section 8 to Central Act IV of 1897.

5. After section 7 of the said Act, the following Section shall be inserted namely,

Recovery of rents, fees and other moneys payable to Government.

6. All rents, fees and other moneys payable to Government on account of fishery leases and licences granted by them may be recovered in like manner as if they were arrears of land revenue."

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GOVERNMENT OF PONDICHERRY
DEVELOPMENT DEPARTMENT

(G.O.Ms.No.1, dated 4th January, 1972)

NOTIFICATION-I .

S.O.No.1 - The following draft rules which the Government proposes to make, in exercise of the powers conferred by section 6 of the Indian Fisheries Act, 1897 (Central Act IV of 1897) as amended by the Indian Fisheries (Pondicherry Amendment) Act, 1965 (Act No.18 of 1965) are hereby published as required under sub-section (6) of the said section for information of all persons likely to be affected thereby and notice is hereby given that the said draft will be taken into consideration on or after 31.1.1972.

2. Any objections or suggestions which may be received from any person with respect to the said draft before the date as specified will be considered by the Government.

Sd.
(P.C. MYTHILY)
UNDER SECRETARY TO GOVT.

DRAFT RULES

1. These rules may be called the Pondicherry Chank Fisheries Rule, 72.

2. In these rules unless there is anything repugnant in the subject or context.

i) "Chank" means shank or Conch, Turbinella, pyrum or Turbinella rapa.

ii) "Chank bed" means the bed of the sea specified in the Schedule I appended to these rules.

iii) "Vessel" include the ships, boats, canoes.

3. i. No person shall fish or dive for chanks in the areas specified in the Schedule appended to these rules except under and in accordance with a lease or licence granted by the Government of Pondicherry or by an officer empowered by them in this behalf.

ii. Every holder of such lease or licence shall strictly abide by the terms and conditions contained therein.

4. The methods of fishing and diving, the crafts and gear employed and all other connected operations for the collection of chanks shall be in strict accordance with the rules and conditions under which the lease or licence is issued.

5. Whosoever commits a breach of rule 3 shall be punishable with a fine which may extend to one hundred rupees and when the breach is continuing breach with a further fine which may extend to ten rupees for every day after the date of first conviction during which the breach is proved to have been persisted in.

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6. A magistrate may, on the conviction of any person for the breach of rule 3, order the seizure, forfeiture and removal of fixed engines erected or used or nets used in contravention of the rule and also order the forfeiture of chanks taken by means of such engine or net.

SCHEDULE

Chank bed:

The bottom of the sea between the low water line and 12 fathoms contour off the Pondicherry and Karaikal regions of the Union Territory of Pondicherry, described in detail below:

Pondicherry Region:

The Chank beds in the sea off the coast of the fishing villages of Kanakachettikulam, Periakalapet, Kuruchikuppam, Keerapalayam, Tuprayanpet, Periyaveerampattinam, Chinnaveerampattinam, Pudukuppam, Pannithittu, Nellavadu, Narambai, and Murthikuppam comprising of the following coastal communes:

1. Duzhavarkarai, 2. Pondicherry, 3) Mudaliarpet, 4) Ariankuppam and 5. Bahour

Karaikal Region:

The chank beds in the sea off the coast of the fishing villages of Mandapathur, Kalikuppam, Akkampetti, Kottucherrymedu, Kasagudimedu, Kilingimedu, Karaikalmedu, Karukkalacherry, Pirumalarayanpattinam kuppam and Keelavanjoor, comprising of the following coastal communes:

1. Kottucherry, 2) Karaikal, 3) Neravy and 4) Pirumalarayanpattinam.

NOTIFICATION

Notice is hereby given that the collection and fishing of the Chank or Conch known scientifically as Turbinella pyrum or Turbinella rapa is a Government monopoly and that any person who fishes collect the said shells without authority will be liable to prosecution according to law. Any shall be the size of 5.715 cms, in diameter and above, that may be found by any one should be offered without delay to an official of the Fisheries Department or to their representative of the lessee of the region in which the Government have leased out the Chank Fisheries viz., in Pondicherry and Karaikal regions. Shell under the above limit should be returned above to the sea.

P.C. MYTHILY,
UNDER SECRETARY TO GOVT.

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PRESENT STATUS OF SMALL-SCALE (TRADITIONAL) MARINE FISHERIES IN ANDHRA PRADESH

P.P. WILLIAMS

Director of Fisheries, Government of Andhra Pradesh. Hyderabad.

"Andhra Pradesh has a fishery potential of 4 lakhs tonnes. The present production is about 1 lakh tonnes, out of which, about 70% is contributed by traditional fishermen. The present status of the traditional fishermen, the different constraints for development of socio-economic conditions of fishermen, the scope and the need for developing the traditional fisheries are discussed. Diversification of fishing gear, Institutional support for financing inputs, dissemination of improved techniques in fishing, fish processing, supply of inputs at reasonable rates are considered necessary for improving the fish production. Cyclone resistent houses, provision of drinking water, medical, feeder roads and educational facilities would go a long way in improving the socio-economic conditions of the fishermen besides creating more employment potential."

INTRODUCTION

Andhra Pradesh is the fifth largest state of India, which was constituted in 1956 by merger of 9 districts of the bifurcated state of Hyderabad with 11 districts of Andhra State. It has 8 coastal districts with a total coastal line of 982 km and a continental shelf

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extending upto 32-43 km. on an average, covering an area of 32,000 sq. miles besides a net work of rivers aggregating to 4160 km. (325 sq. miles in area), and 60 reservoirs and 40,000 tanks (5 lakhs acres in area) offering scope for development of capture and culture fisheries.

There are 2,37,470 coastal fishermen distributed in 408 villages in the coastline ekeing their livelihood by exploitation of inshore waters. 24,000 craft and 65,000 tackle of various types are operated for traditional fishing which contribute about 70% of the total marine landings. In view of the latest techniques developed in catching prawns by bottom-set gill nets and improved methods adopted in processing, the traditional fisheries has also been playing a considerable role in the export trade.

In spite of the important role played by the traditional fisheries sector, the socio-economic situation of the fishermen residing in the coastal fishing villages is poor due to several factors such as lack of feeder roads, regulated markets, chain of ice plants, provision of Institutional finance for purchase of inputs, regulated markets, etc. The industry partly suffers also due to conservative approach of the traditional fishermen. Further while the estimated potential of marine fisheries is 4 lakh tonnes, the existing marine production is about 1 lakh tonnes. There is thus a wide gap giving an opportunity for further exploitation of inshore waters and this would be possible to a larger extent by developing traditional fishing only. There is, therefore, considerable scope for improving the status of the fishermen by undertaking extension work on a large scale by introducing and demonstrating diversification of fishing gear, improvements in processing of fish and provision of feeder roads, drinking water, housing and medical facilities.

THE AVERAGE FISHERMEN

The fisher folk of Andhra Pradesh can be classified broadly into inland and marine fishermen. While for inland fishermen fishing is only a subsidiary occupation, the fishermen living in coastal fishing villages depend totally on fishing for their livelihood. The coastal fishermen generally in clusters of huts made of palmyrah or coconut leaves or live 'dubbu' or 'jammu' grass. The huts are generally round in shape and put up in a dis-organised way and ill-ventilated. The entire family lives in a hut which serves all domestic purposes such as cooking, storing, eating, sleeping, etc. Tribal leadership is still in vogue in fishermen community. The 'pettandars' or leaders in each village generally control the life in the whole fishing village with customary rights and powers vested in them. Their presence will be witnessed during the celebration of religious functions and social meetings. Due to unhygenic conditions prevailing, occurrence of epidemics is common which is attributed by the fishermen to the displeasure of God or Goddesses for which sacrifice will be offered by them.

Most of the coastal fishing villages are not connected to the main arteries of communication and most of them are even deprived of electricity and drinking water facilities. Lack of communications has placed the fishermen in a disadvantageous position in regard to selling of their catches. However laying of feeder roads and provision of electricity and water facilities figure now under various developmental programmes and it is hoped that this major handicap will be removed in course of time.

FISHERY RESOURCES AND FISH PRODUCTION

The number of marine fishing villages, coast-line and fishermen district-wise population are given in TABLE I.

TABLE I

Coastline, number of fishing villages and fishermen population in the districts of Andhra Pradesh.

District	Coastline (km)	Fishing villages	Fishermen population	Active fishermen
Srikakulam	192	109	57,187	13,972
Visakhapatnam	160	74	54,259	15,998
East Godavari	174	72	39,315	11,657
West Godavari	32	9	8,040	1,160
Krishna	80	29	14,696	4,413
Guntur	42	16	19,552	5,493
Prakasam	102	45	22,102	6,182
Nellore	200	54	22,319	5,717
Total	982	408	2,37,470	64,592

The fishing activity in the State is influenced to some extent by S.W. monsoon from June to September and the N.E. monsoon from October to December. But unlike the West Coast, the S.W. monsoon manifests in the form of few cyclonic spells lasting for about 3 to 4 days only. Though cyclonic weather renders marine fishing not possible for about 40 to 50 days in a year, fishing is not stopped for long stretches in any part of the year.

The dominant marine fishery of the State is pelagic constituted by ribbon fish, seer fish and other clupeids. The demersal fisheries of the State consist of elasmobranchs, cat fishes, scienaids, Leiognathus Gazza and perches. The major fishing season is January to April. The data on exploratory fishing reveals that in the matter of potential yield of demersal fishery wealth, the upper east coast has a stock of 4.26 tonnes per sq.km. The potential catch of the State is estimated at 4,06,800 tonnes.

The total fish production of Andhra Pradesh during the period 1974 to 1977 is given in Table II.

TABLE II

Fish production in Andhra Pradesh (Figues in tonnes)

I. MARINE FISHERIES	1974	1975	1976	1977
a. Traditional fisheries	1,49,269	1,45,972	1,18,953	73,805
b. Mechanised Craft	9,529	9,666	12,368	26,951
Total	1,58,818	1,55,638	1,31,321	1,00,756
II. INLAND FISHERIES	99,733	94,943	1,04,339	1,19,013
Grand total	2,58,551	2,50,581	2,35,660	2,19,769

The catch composition of marine fish landings in 1977 in the State is given in Table III.

TABLE III. Catch composition of marine fish landings in 1977.

S.No.	Name of fish		Percentage
1.	Elasmobranch	..	6.4%
2.	Eels	..	0.4%
3.	Catfishes	..	5.6%
4.	Chirocentrus	..	1.2%
5	a. Lesser Sardines	..	10.9%
	b. Other Hilsa	..	1.6%
	c. Anchoviella	..	8.9%
	d. Thrissocles	..	1.4%
	e. Other Clupeids	..	2.3%
6.	a. Harpodan nehereus	..	0.9%
	b. Saurida & Saurus	..	0.9%
7.	Hemirhamphus & Belone	..	0.1%
8.	Flying fish	..	0.1%
9.	Perches	..	2.7%
10.	Red Mullets	..	0.3%
11.	Polynemids	..	0.7%

12.	Scienaids	..	10.1%
13.	Ribbon fish	..	8.5%
14.	a. Caranx	..	3.9%
	b. Chorinemus	..	0.6%
	c. Other carangids	..	0.1%
	d. Coryphaena	..	0.1%
15.	a. Leiognathus	..	5.9%
16.	Lactarius	..	1.1%
17.	Pomfret	..	2.5%
18.	Mackerel	..	1.0%
19.	Seer fish	..	3.2%
20.	Tunnies	..	0.4%
21.	Sphyraena	..	0.1%
22.	Mugil	..	0.2%
23.	Soles	..	0.7%
24.	a. Penaeid prawns	..	4.7%
	b. Non-penaeid prawns	..	6.5%
	c. Crabs and other crustaceans	..	0.7%
25.	Cephalopods	..	0.4%
26.	Miscellaneous	..	4.9%
			100.1%

FISHING GEAR AND CRAFT

The traditional small-scale fishing fleet on the coast is given in Table IV. (Source : Departmental Census, 1977).

TABLE IV. Strength of fishing fleet engaged in small-scale fisheries

Craft	Nos.
Nava	1,165
Catamarans	18,132
Kakinada type boat	4,184
Big sail boats	109
Small sail boats	672
Total	24,262

Tackle	Nos.
Shore seine	1,471
Bottom gill nets	6,480
Nylon gill nets	16,676
Drag nets	5,729
Gill nets	18,543
Drift nets	1,187
Bag nets	159
Hooks & lines	2,587
Boat seine	1,481
Others	11,265
Total	65,578

A brief description of indigenous craft and tackle is given below:

1. Catamarans:- It is a keelless craft of about 21 to 24 feet in length and constructed with wood of Albisia stipulata (Royya Wood). In view of the shortage of this particularly suitable wood, the fishermen are constrained to use the wood of other trees. It consists of 2 main logs and 2 side logs. All these logs are cut into boat shape and tied together with rope. Two mango planks are tied on either side of the craft to give a perfect boat shape. It costs Rs.1,000/- to Rs.3,000/- depending on the size.

2. Stitched boat:- This is also a keelless boat. It is constructed with planks, stitched together with palmyrah leaf fibre, keeping a continuous rope in between the seams. This gives the boat sufficient elasticity to compensate for lack of strength due to lack of frame work and in view of its lightness can cross the surf and land on the beach. It has a mast and sail. The length of the boat is 25' to 30' and the breadth ranges from 4'6" to 8'6" depending upon its use for gill net fishing or boat seine operation respectively. The cost varies from Rs.2,000/- to Rs.6,000/-.

3. Kakinada nava:- A keelless boat of about 35' in length (2 to 3 tonnes capacity) made of teakwood and carvel built. It costs about Rs.4,000/- to Rs.8,000/- and used for drift nets, set nets, and stake nets and shore seine fishing.

The traditional tackle mostly used in this area are shore seine, boat seine, gill nets fabricated with nylon yard and cotton yarn. The material used and fish caught by these tackle are given in Table V.

TABLE V. Particulars of marine fishing nets

Item	Type of net	Material used	Season of operation	Fish caught
Boat seine	-	Cotton	September to April	Jew fish, Lactarius, pomfret, prawns, etc.
Shore seine	Encircling	Cotton 20 count	November to February	Prawns, jew fish, cat fish, ribbon fish, etc.
Gill nets	Gilling & Entangling	Nylon yarn	Throughout the year except in bad weather	Prawns, pomfrets, seer, Hilsa, sardines.
Cotton gill net	Gilling	Cotton yarn	Throughout the year	Hilsa, sardines, seer, pomfret, etc.

LANDING AND BERTHING FACILITIES

There are 253 fish landing centres along the coast of Andhra Pradesh and most of them do not have any shore facilities. Smaller fishing craft like catamarans, small navas and stitched boats manoeuvre through the surf and land on the open beach. The big navas and mechanised

boats conduct fishing at places where no landing is possible and their catch is transferred to catamarans and brought to shore for disposal.

Where rivers and streams enter the sea, boats operating in the inshore waters, enter the river mouth and land the fish on the banks. While smaller crafts do not have much difficulty in negotiating the bar, larger boats (Navas) have to wait for the high tide before entering into the river mouth.

At present Visakhapatnam and Kakinada are the only two fishing harbours in the State suitable for use by mechanised fishing vessels. Visakhapatnam is India's fifth largest commercial port on the 1250 km length of the east coast, between Paradeep (Orissa) on the north and Madras (Tamilnadu) to the south. Plans were drawn up to construct fishing harbour in two stages, with Stage-I to handle 150 numbers of 10 metre fishing vessels and 15 numbers of 23 metre trawlers, and Stage II to handle 250 numbers of 10 metre mechanised fishing vessels and 30 trawlers. The work on the first stage was started in 1974. The Government of India approved the second stage harbour at Visakhapatnam at a cost of Rs.630.50 lakhs with World Bank assistance.

The present Kakinada fishing harbour is about 6 km from the sea on the Commercial Canal which extends to the centre of Kakinada city. The entrance to the Commercial Canal is sheltered by a large natural break water known as Godavari point which almost encircles Kakinada Bay. The present fishing harbour is located on the southern commercial canal in a densely populated area close to the heart of the city and it can accommodate about 75 numbers of 10-metre mechanised fishing vessels. Since the mechanised vessels operating regularly from this centre increased to 300 there is congestion resulting in traffic hazards in commercial canal. Realising the importance of Kakinada as a major

fishing centre and also the technical and economic feasibility, expansion proposals were also proposed to the World Bank which has cleared the project (Stage-II) costing Rs.460.00 lakhs.

At present there are no fishing harbours south of Kakinada suitable for regular use by mechanised fishing vessels. As a result of construction of 3 groyens with indigenous materials at Nizampatnam the bar showed signs of stabilisation and about 115 sailing vessels which go for fishing voyages of 4-5 days duration are using the existing facilities. In addition to this 25- numbers of 9-metre fishing vessels are also being operated taking advantage of the bar conditions. The World Bank has also cleared a Project costing Rs.77.00 lakhs for construction of fishing harbour at Nizampatnam which will provide additional landing and berthing facilities for 60 mechanised boats and 60 non-mechanised boats.

The Government of India recently sanctioned construction of fishing harbour at Bhavanapadu which, when completed, would provide landing and berthing facilities for 200 mechanised boats.

TRAINING AND RESEARCH

1. Fisheries Training Institute, Kakinada. This was established by the State Government in the year 1958. The fishermen having 5 years of sea-going experience and possessing a minimum educational qualification of 7th standard are admitted in the Institute for imparting training in fishing methods, gear technology, elementary principles of navigation, running and maintenance of internal combustion engines. They are also given intensive practical training in all subjects. The duration of the course is 12 months. 75 candidates representing mostly coastal districts are recruited for each batch and each candidate is given a stipend of

Rs. 75/- per month. So far the Institute has trained 733 fishermen who are qualified to drive small mechanised fishing vessels. The trained candidates are being given preference in allotment of mechanised boats.

2. Prawn Breeding Unit, Kakinada (I.C.A.R.Unit). This unit is working on the possibilities of prawn breeding in confined waters so that the prawn culture can be taken up on extensive scale.

3. Central Institute of Fisheries Technology, Kakinada Unit. This is a Central Institute working on evolving suitable gear designs for this region.

4. Brackish Water Fish Farm of C.I.F.E. at Kakinada. This is working as a unit of Central Institute of Fisheries Education and is being made use of for both training of the Institute's candidates and for development of new techniques in brackish water fish farming.

5. Brackish Water Fish of A.P.Agricultural University at Kakinada.. This is established in the year 1976. It is a State scheme partly financed by I.C.A.R. now transferred to Agricultural University.

6. Central Marine Fisheries Research Institute, Waltair and Kakinada Research Centres. These centres are engaged in several aspects of marine fisheries research along the Andhra coast. The centres also carry out researches on mariculture.

7. Exploratory Fisheries Project, Vizag Base. This is a Central organisation conducting experimental fishing in the off-shore waters off Vizag coast.

8. Department of Marine Sciences. A separate department was started for marine sciences in the Andhra University, Waltair having a unit of oceanography in the Department.

ANDHRA PRADESH FISHERIES CORPORATION

The Andhra Pradesh Fisheries Corporation which was established in 1974 under the Companies Act (1958), with headquarters at Kakinada, intially took over the physical assets i.e., Boat Building Yard, Ice Plants and Cold Storages, a Canning Plant and trawlers from the Department of Fisheries. A brief account of the Andhra Pradesh Fisheries Corporation's main activities is given below:-

1. Boat Building Yard, Kakinada. The yard has a designed capacity to build 60 boats per year in the 10 to 12 m size range. There are 233 workers employed in the yard. Since its transfer to the Corporation, 229 boats were constructed till the end of August, 1978.

2. Freezing Plant, Visakhapatnam. The plant which has a capacity to freeze 4 tonnes of shrimps per day and a storage capacity of 50 tonnes went into production in 1976. The Corporation exported about 508.75 tonnes of frozen shrimp valued at Rs. 219.65 lakhs to Japan and the U.S.A. till the end of June, 1978. A second freezing plant of the same capacity is being established at Kakinada.

3. Ice Plants. Ice Plants are run by the Corporation in Visakhapatnam (20T), Nellore (10T), Padala (5 tonnes) and Hyderabad (2 tonnes) and a new plant of 10 tonnes per day at Kakinada is nearly completed.

4. Cannery, Kakinada. The Cannery has an installed capacity to produce 1000 numbers of 4-lbs cans per shift.

5. Fishing Gear Unit, Kakinada. The unit was established in February, 1975 with the main object of creating employment opportunities for fisherwomen. It is employing 30--80 people for manufacturing gill nets and trawl nets.

6. Fishing Operations Unit. The fleet consists of 18 trawlers in the size range of 9-13 metres in length and two Mexican trawlers. These vessels are operating from Kakinada and Visakhapatnam.

7. Marketing. The Corporation operates retail stalls in Hyderabad, Vijayawada, Eluru and Guntur where mainly marine fish is marketted.

8. Diesel oil out-lets, Visakhapatnam and Kakinada. These out-lets were opened to supply diesel oil, lubrication oil, grease, etc. required for day-to-day running of mechanised boats at reasonable rates.

FISHERIES CO-OPERATIVES

Andhra Pradesh has 1182 Fishermen Cooperative Societies out of which 656 are in the coastal districts, the details of which are given in Table VI.

TABLE VI

Details of Fishermen Cooperative Societies in Andhra Pradesh

COASTAL DISTRICTS	SOCIETIES (Nos.)	MEMBERS (Nos.)	SHARE CAPITAL (Rupees)
Primary Fishermen Cooperative Societies	647	71,877	8,17,680
Primary Fishermen Marketing Coop.Societies	5	3,572	57,041
District Fishermen Marketing Coop.Societies	2	89	1,14,525
Central Fishermen Cooperative Socities	2	576	7,59,475
T o t a l	656	76,114	17,48,721

The formation of Societies in the Fisheries Sector started even prior to pre-Independence days with a view to making the members (fishermen) eligible for obtaining subsidies on cotton and nylon yarn.

Now the Government have issued orders giving preferential treatment to Fishermen Cooperative Socities in the matter of lease of water resources.

In the year 1960 a Central Society for Andhra region known as Andhra Fishermen Central Cooperative Society Ltd. was registered with head-quarters at Kakinada. The area of this Central society covers all the Districts of Coastal Andhra and Rayalaseema. The membership of society is as follows:

Government	:	1
Primary Fishermen Cooperative Societies	:	252
Associated members	:	284

The Society has a Shark Liver Oil Factory at Kakinada. The business of the Society is distribution of cotton and nylon yarn and other requisites to coastal fishermen. It is also implementing mechanisation scheme with 45 mechanised boats with the assistance of A.R.D.C. A Deputy Director of Fisheries is the Managing Director and the District Collector, Kakinada is the Chairman of the Society.

At the District level the Assistant Directors of Fisheries act as ex-officio Deputy Registrars, at Zonal level the Deputy Director of Fisheries act as ex-officio Joint Registrars and at the State level the Director of Fisheries act as ex-officio Registrar of Cooperative Societies.

HANDLING AND DISTRIBUTION

The bulk of the traditional fishing craft does not carry ice on fishing trips as they generally go for one-day trips. Save big trawlers, the other mechanised fishing vessels too, upto 12 metres, conduct daily fishing. It is not customary for indigenous boats to take ice for their daily trips. As prawn is fetching a high rate now due to high demand from the exporters, a few boats are taking ice on board to ensure better

quality of prawns. Ice is not used for preserving the fish on board the vessels conducting daily trips. In certain places like Nizampatnam, Guntur district where people go out in country boats (Kothapalem Nava) for voyage fishing with gill nets for 5 to 6 days, salt is taken for curing the fish on board the vessels.

The fish catches are landed mostly on beaches at different landing centres. There is no system of pooling of catches of different landing centres for transport to any wholesale market. Actually the fish immediately after it is landed is disposed of to the merchant or their agents waiting at the landing contres either at negotiated rates or in auction for consumption either in fresh condition or for processing industries.

PROCESSING

About 70% of the fish caught in Andhra Pradesh is either salt-cured or sun-dried and disposed of in weekly shandies. The fish curing methods with salt especially the proportion of the salt to be used for different varieties of fish is known to the fishermen community and curing of fish is widely practiced in all the fishing villages. The list of freezing and processing plants available in Vizag and Kakinada are given in Annexure I. Freezing is mostly taken up for exportable varieties of prawns caught mainly from the sea by trawlers as well as by gill nets especially designed for catching prawns. The frozen prawns are exported from Visakhapatnam Port.

There is one Shark Liver Oil factory in the Cooperative Sector in Kakinada. It is engaged in production of shark liver oil capsules which are distributed to various Government Hospitals in Andhra Pradesh and other organisations. There is no fish meal plant in Andhra Pradesh.

EXPORT

The development of marine exports has gained momentum from the year 1971. Prawns caught in the sea of the State's coast were not being directly exported till October, 1971 from the ports of Andhra Pradesh due to various reasons, the most important of which was that cargo ships with refrigerated/holds were not calling at Visakhapat nam Harbour. Of late the exports to foreign countries from the ports of Andhra Pradesh haveincreased considerably. The exports of frozen prawns by processing firms during the period 1971 - 77 are given in Table VII.

Table VII Exports of frozen prawns from Andhra Pradesh

Year	Quantity (tonnes)	Value (Rupees) in lakhs
1971	104.59	23.53
1972	635.02	165.25
1973	708.05	221.41
1974	760.08	250.65
1975	1,355.36	600.30
1976	1,802.19	980.75
1977	1,775.50	885.32

MARKETING

A detailed marketing study with a view to identify the consumer and user demand in the coastal and interior districts, marketing channels for fresh fish, dry and export varieties of fish, trading communities, localities, bottlenecks and rational methods to absorb additional quantity of fish to give optimum benefit to producer and consumer, ability of present infrastructure especially transport

and processing facilities has yet to be undertaken.

The fishermen operating at different landing centres have little or no organisation of their own to protect their interest. They are illiterate, poor and conservative without much of bargaining power for their products. They often play into the hands of money lenders who in most of the cases are middlemen trying to exploit the conditions of the fishermen by stipulating conditions advantageous to them only.

At every place where money lenders operate, either the money lender or his agent collects the fish catches from the fishing units to which they have advanced money to the extent of Rs. 1,000/- to Rs. 5,000/- depending upon the capacity, need etc. Generally these people pay to the fishermen about 25 - 35 paise less per kg for fish and Rs. 1.00 - 2.00 less per kg for prawns than the prevailing market rate.

There is normally no question of disposal of all the fish landings of any centre by auction. The traders who purchase the fish regularly from the fishing units financed by them establish procurement centres/godowns from where they arrange the transport of fish. Sometimes there may be many procurment centres at one landing place. From these procurement centres the fish is taken by headloads/cycles/buses/lorries to different places for distribution to consumers. The mode of transport mostly depends on the total quantity available for transport from the landing cente. While the retail merchants who take the fish from landing centres may not pay much attention for use of ice for transport of fish, the other merchants who transport their fish to far off places like Calcutta, Tatanagar, Rurkela, Orissa, Hyderabad,etc. invariably use ice for packing their fish even at the procurement centres.

Nearly 70% of the fish is either salt-cured or sun-dried and is disposed of in dry fish shandies. Normally these shandies operate once in a week, the important shandies being Nagayalanka, Pathapadu, Dhowleswaram, Tadepalligudem, Kakinada, etc.

MIDDLEMEN _ VS _ FISHERMEN

Middleman is not only a money lender but a business man too and maintains the link between producer and the consumer. The poverty of the fishermen is one of the destabilisers in fishing industry. To maintain himself in the off season and making huge investments on inputs required for conducting fishing, the fishermen have to approach a money lender who mostly, in his own interest, takes the risk of financing the poor fishermen for pursuing his profession. Unlike cooperatives, the middle men advance money to fishermen not only for inputs but also for his day-to-day needs and transport of fish catch. To ensure that the money invested by him is returned the middlemen undertakes the responsibility of the sale of fish landed by the loanee, by no doubt undertaking all the difficult tasks involved in transport and sale of highly perishable product. It may perhaps be said that the majority of fishing is financed and maintained by the middlemen although the middlemen to a greater extent compensate the risks by exploiting the fishermen to his advantage.

FISHERIES ADMINISTRATION

The Department of Fisheries is mostly responsible for development of fisheries in the State as also improving the economic conditions of the fishermen besides improving their standards of life. It is an independant department under the control of the Forests and

Rural Development Department. At the headquarters, the Director of Fisheries is assisted by an Additional Director of Fisheries, Joint Directors of Fisheries, Deputy Registrar of Cooperative Societies Accounts Officer and other officers (see Annexure II). Andhra Pradesh is one State where Fishermen Cooperative Societies play a vital role in the development of fisheries and the Director of Fisheries has been vested with the powers of the Registrar of Cooperative Societies so far Fishermen Cooperative Societies concerned. At the regional level the Director of Fisheries is assisted by six Deputy Directors of Fisheries each one being in-charge of a zone consisting of a few districts. The Deputy Directors of Fisheries supervise and coordinate the activities of the Assistant Directors who are district level officers. The Assistant Director is assisted by field officers such as Inspectors of Fisheries, Research Assistants, Assistant Inspectors of Fisheries, Fieldmen, etc.

CONCLUSIONS

Keeping in view the existing status of small scale fisheries as discussed in the earlier chapters and the scope and need for developing this sector, action on the following aspects is considered necessary for the development of the traditional fisheries.

1. a. Provision of feeder roads connecting the fishing villages to the existing main road.

   b. Repairs to the feeder roads already laid under various programmes and entrusting their maintenance to the Zilla Parishads.

It is desirable to connect a cluster of fishing villages to each other and connect the main village by a feeder to the existing main road.

2. Provision of houses which can withstand cyclones. They may be specially designed adopting the cheapest and suitable design and subsidies maybe granted to the fishermen for owning the houses.

3. Provision of drinking water facilities to each fishing village.

4. The inputs such as nylon, logs for teppas may be supplied through Government agencies so that the fishermen may get the required quantities at any time they need instead of depending on different merchants for the supply of material who partly exploit the fishermen by charging exhorbitant rates.

5. Extension services may be strengthened by different means such as audio-visual, pamphlets, personal contacts,etc. for taking advanced techniques achieved in different research stations to the fishermen proper.

6. Experimental and demonstration units may be set up for diversification of fishing methods.

7. Provision of training facilities to fishermen.

8. Efforts should be made to provide Institutional finance to the fishermen through Banks on personal securities only. This will help in eliminating middlemen influence to a considerable extent on the fishermen community.

ICE PLANTS AND FREEZINGS PLANT IN ANDHRA PRADESH

Sl. No.	District and centre	Ice plant (tons per day) Sector		Ice and Fish Storage (tons) Sector		Freezing capacity (tons per day) Sector		Frozen Storage (tons)
		Public	Private	Public	Private	Public	Private	
1	2	3	4	5	6	7	8	9
	SRIKAKULAM DISTRICT:							
	VISAKHAPATNAM DIST.:							
1.	Union carbide India Pvt. Ltd., Vizag	-	-	-	-	-	4.5	260
2.	East Coast Marine (Products) Pvt.Ltd., Vizag.	-	-	-	-	-	5	50
3.	George Meizo & Co., Vizag	-	-	-	-	-	6	80
4.	Crystal Ice Factory, Vizag	10	-	-	-	-	-	-
5.	Bizili Ice Factory, Vizag	5	-	-	-	-	-	-
6.	Sri Vijaya Ice & Cold Storage, Vizag	15	-	-	-	-	-	-
7.	Kerala Food Packers Bheemunipatam	-	5	-	-	-	2	25
8.	Ice & Cold Storage Plant A.P.Fisheries	20	Ice Fish	50 150	-	4	-	250

Contd..

1	2	3	4	5	6	7	8	9
EAST GODAVARI DISTRICT:								
1.	Fish Products(P) Ltd. Kakinada	-	15	-	60	-	4.5	200
2.	Pyda Kakinada	-	20	-	-	-	-	-
3.	Rukmini "	-	10	-	-	-	-	-
4.	Vennal "	-	6	-	-	-	-	-
5.	Himalaya "	-	4	-	-	-	-	-
6.	Coramandal "	-	4	-	-	-	-	-
7.	Venkateswara "	-	4	-	-	-	-	-
8.	Sri Satyanarayana Kakinada	-	1	-	-	-	-	-
9.	Krishna Kakinada	-	0.5	-	1	-	-	-
10.	Sri Surya "	-	0.5	-	0.5	-	-	-
11.	Geeta "	-	0.5	-	0.5	-	-	-
12.	Rama "	-	-	-	0.5	-	-	-
13.	Devi "	-	0.5	-	0.5	-	-	-
14.	Trindha "	-	1	-	0.5	-	-	-
	Star ice factory, Repalle	-	6	-	-	-	-	-
	Ice factory, Vetapalem	-	5	-	-	-	-	-
	Venkatarama Ice Plant, Numbur	-	5	-	-	-	-	-
	T O T A L	23	118.0	200	63.5	4	22.0	665

MARINE FISHERIES OF ORISSA

A.B.ROY

Department of Fisheries, Government of Orissa

INTRODUCTION

The coast of Orissa stretches to a length of 480 km with a continental shelf area of 25,000 sq.km. The sea off Orissa is rich in pelagic and demersal fishes. Prior to 1957, the entire marine fish catch was realised by the traditional fishing. However, with the introduction of mechanised fishing vessels and establishment of other infrastructural facilities, considerable progress has been made in the marine fisheries sector of the state.

POTENTIAL RESOURCE

The Indian Institute of Foreign Trade estimated an exploitable fish stock of 60,000 tonnes within the 40 fathom depth zone. Beyond this region, the potential resource has not yet been assessed. Nevertheless, it is indicated that about 60,000 tonnes of fishes are available in the offshore waters and deep sea off Orissa. The exploited marine fish production of this State in 1975-76 was of the order of 21,000 t and in 1977-78, it increased to 28,000 tonnes. The exploited fish production thus forms about 23.3 percent of the estimated total annual potential resource.

PRESENT STATUS OF THE MARINE FISHERIES

Fishing crafts

About 6,000 non-mechanised boats operate along the coast of Orissa. They realise about 18,000 tonnes of fishes

and contribute to 65% of the total marine fish catch of the state. There are 391 mechanised fishing vessels, consisting of 126 gill netters and 265 wooden trawlers. The catch from the mechanised boats is about 10,000 tonnes which forms about one third of the total catch. In general, the coastal waters of Orissa remain under exploited.

Fishing season and the fishery

Orissa coast can be divided into two regions depending on the contour of the coast line and availability of fish. Balasore coast, which is in the north, is very shallow. This coast is predominant in pelagic fisheries such as Hilsa, silver and black pomfrets, Indian salmon, seer fish and cat-fish. Small mechanised boats of 30' to 32' length with gill nets of 5,000' length, 30' width having 4 to 5" mesh size are operated in this region. The coast of Cuttack, Puri and Ganjam districts covering the central and southern regions, is relatively deep and is suitable for trawl net operation. Here 32' to 42' long wooden vessels, fibreglass boats and 57' steel vessels are in operation. The catch is mainly composed of prawns, sciaenids, pomfrets and other bottom fishes. These vessels are now operating mainly from Paradeep port covering an area of 800 sq.km up to a depth range of 20 fathoms.

The marine fishing season starts after monsoon and extends up to March. The peak period for the pelagic fishery in the northern region is from August to October, and in the central and southern region, October to December is the main season for the demersal fishery. Since the coast is subjected to heavy storms and cyclones almost every year, the average fishing days in an year is about 200.

In 1974-75 the marine fish landing was constituted by Hilsa (40.32%), pomfrets (7.92%), seer fish(6.04%), catfish (23.6%) and sharks and skates (6.68%); other fishes encountered in the catches were sciaenids, perches, and thread-fins.

Table I gives the species composition of the catch in the gill nets operated during 1975-76, 1976-77 and 1977-78

TABLE I. Catch composition(in percentage) of the landings by gillnetters

	1975-76	1976-77	1977-78
Hilsa spp.	46.50	25.24	10.63
Pomfret	13.00	30.82	50.00
Seerfish	4.50	8.46	5.86
Catfish	13.00	13.51	18.80
Sharks & skates	4.00	4.20	2.30
Sciaenids and perches	19.00	17.77	12.41

Percentage composition of the important varieties of fishes landed by the trawler is given in Table II.

TABLE II. Catch composition(%) of the landings by trawlers

		1974-75	1975-76	1976-77	1977-78
Prawns	Large	7.10	1.60	0.73	1.50
"	Medium	13.40	6.80	1.78	7.00
"	Small	2.40	2.50	4.63	9.70
Pomfrets		2.50	5.30	2.31	2.30
Miscellaneous fishes		74.60	83.30	90.55	79.50

The central and southern regions of the coast, especially the area between Paradeep and Gopalpur, form a good trawling ground for shrimps. Daily, about a tonne of large sized shrimp is landed by the mechanised boats as well as indigenous crafts. Good trawling ground is also found off Devi River mouth up to Konark,and large quantities of exportable shrimps are available in this region.

The mechanised boats operate from six important bases along the coast. However, above 66% of these boats are based at Paradeep port (Table III). Steel trawlers operating at 15-20 fathom depth region land mainly prawns (13.4 % of the catch) sciaenids (28%) pomfrets (10%) and sharks, rays and skates (29.6%).

TABLE III. Number of mechanised boats operating from different bases along Orissa coast.

Base	No. of boats operating from the base
1. Kirtania	10 (Gill netters)
2. Chandipur	107 -do-
3. Dhamra	7 -do-
4. Rushikuliya	2 -do-
5. Paradeep	260 (Trawler)
6. Astrang	5 -do-

Processing and preservation facilities

Recently 4 ice plants and 2 freezing plants with frozen storage facilities have been established near Paradeep. The Marine Products Export Development Authority have proposed to construct a 200-tonne frozen storage here.

There are 12 processing plants having a total capacity of 57 tonnes. Export of fishery products from the State was started in 1969, and during the last 9 years, the quantity of marine products exported has gone up from 4.18 tonnes to 1847.9 tonnes (Table IV).

TABLE IV. Quantity and value of the fishery products exported from Orissa

Year	Quantity in tonnes	Value (Rs.lakhs)
1969-70	4.18	-
1970-71	61.56	-
1971-72	179.08	50.72
1972-73	375.51	94.63
1973-74	391.80	116.28
1974-75	823.00	241.49
1975-76	1063.00	450.00
1976-77	2075.93	1137.73
1977-78	1847.90	728.38

Fishing harbour

Berthing and landing facilities are at present available at Chandipur and Dhamra. It is proposed to provide such facilities at Hansua, Rushokulya, Adhwan, Kasafal, Balitutha, Kirtania. Work on fishing harbours at Astrang, Paradeep and Gopalpur would be starting soon.

Other infrastructure facilities

There are 12 boat building yards in the State with a total construction capacity of 200 boats. There is also a nylon net making plant, and one more plant is proposed to be established soon.

Financing of fishery projects

The Orissa State Finance Corporation is the main financial Institute providing assistance to fisheries projects in the State. This Institute has so far sanctioned an amount of Rs. 4.5 crores mainly for procurement of boats. Other financial Institutions have also sanctioned substantial amount for acquisitior of mechanised boats.

STATUS OF SMALL SCALE FISHERIES IN THE UNION TERRITORY OF ANDAMAN AND NICOBAR ISLANDS

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The Union Territory of Andaman and Nicobar Islands is a group of about 224 islands lying in the south-eastern part of Bay of Bengal, about 1200 km away from the east of mainland of India, between 6° and 14° North lattitude and 92° and 94° East longitude. Geographically these islands are divided into two main groups viz., the Andaman Group of Islands and the Nicobar Group of Islands and separated by the 10° channel. The total area of the islands is approximately 8293 sq.km with a coastline of about 2000 km including creeks, islets and estuaries.

Awareness about fishery potential in the seas of Andaman and Nicobar Islands and its proper utilisation through developmental programmes is of very recent past. Little attention was paid to the availability of these vast resources before and the year 1949 witnessed the birth of the first Fisheries Research Unit at Port Blair. But the pace of development remained slow.

The regions around the Andaman and Nicobar Islands remained the least studied area for potential fishery resources of the country. The Fisheries Research Unit was converted into a Development Unit in 1955 under the direction of a Fisheries Development Officer,

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who was reponsible for initiating and implementing the fisheries developmental activities under the Five Year Plan schemes.

Before 1961 the Fisheries Department was under the charge of the Deputy Commissioner and as such implementation ofthe fisheries development schemes was his direct responsibility through the Fisheries Development Officer. The Fisheries Department was declared as an independent office in 1961 under the control of the Fieheries Development Officer as Head of the Office. The department was again up-graded to the level of Directorate in 1975 and a Director of Fisheries was appointed.

These islands, the natural home of certain primitive tribals, had no traditional fishery in the pre-Plan period in the absence of professional fishermen. The aboriginals catch fish by using bow and arrows and the tribal people of the Nicobar Islands use spear with one or more barbs. Apart from the tribals who are not professionals in the sense that they do not fish for profit, there is no endemic community of fishermen in these islands. During the subsequent period the Government initiated a fishermen settlement scheme under which fishermen mainly from the southern States of India were brought to the islands. There has also been some voluntary migration of fishermen from Andhra Pradesh.

No fisheries schemes were drawn or implemented in the First Five Year Plan. It was only during the Second Plan that 5 fisheries schemes viz., mechnization of fishing boats, introduction of improved types of fishing gears, expansion of office and laboratory, loans to fishermen and Fishermen Cooperative Societies and establishment of fish curing yard were drawn up and put for implementation.

During the Third Plan period emphasis was laid on settlement of fishermen families, training of fishermen in the various fisheries institutes in the mainland, supply of fishingrequisities on subsidy basis, supply of ice and storage facility. During the Fourth Plan, apart from the schemes which were continuing from the earlier plan, new schemes such as training of departmental personnel, survey and development of shell fishing, survey of fishing grounds and organisation of Fishermen Cooperative Societies were taken up.

During the Fifth Plan period a total provision of Rs.102 lakhs was approved for the implementation of about 11 schemes as detailed below:-

1. Inland Fisheries Development.
2. Survey of Fishing Grounds.
3. Setting up of a Fishermen Training Centre at Port Blair.
4. Inservice training to Departmental personnel
5. Strengthening of Department of Fisheries.
6. Fisheries Extension Centre at Car Nicobar.

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7. Settlement of Fishermen Families.

8. Supply of essential fisheries requisites.

9. Organization of Fishermen Coop. Societies.

10. Mechanised Fishing in Andaman.

11. Settlement of floating fishermen and dependents of fishermen settlers.

Out of the population of 1,15,133 (as per 1971 census) the fishermen population is estimated to be about 980 only out of which about one third are part-time fishermen and two thirds are professional fishermen. They are engaged only in inshore fisheries with small dinghies and canoes and run a subsistence type of fishing. Small gill net, beach seine, anchor nets, cast nets and hooks and lines are used by these fishermen for fishing. Mechanised fishing in these islands is only of recent origin (1976) when the Department of Fisheries acquired 7 numbers of 36 ft. fishing boats from mainland.

In april, 1976, a Fisheries Expert Team of Government of India visited these islands to study the possibilities of the exploitation of its vast fishery resources. They have recommended to set up a Tuna Fisheries Project at Campbell Bay, in Great Nicobar, the Southern most island, for exploitation of tuna and tuna like fishes on commercial basis and to undertake various developmental projects in different parts of these islands. Taking into consideration the various recommendations of the Expert Committee a new, and more scientific orientation has been given to the fisheries development

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plans, and such schemes have been formulated to implement during the Sixth Five Year Plan period with a total outlay of about Rs.36 crores. A Fisheries Development Corporation has been proposed to be set up in these islands for which a project report has already beer submitted to the Government of India. A Boat Building Yard for Andamans has been proposed for which also the project report has been submitted to the Government of India. Apart from these, many schemes have been formulated Viz., introduction ofmore numbers of medium sized fishing vessels,fitting of outboard engines in non-mechanised boats, supply of other equipments for the exploitation of marine fisheries on subsidy basis, introduction of aquaculture, training in fisheries, shark liver oil extraction, processing,storage and marketing, supply of oil and potable water at fishing centres, survey and research, service station for repairing fishing vessels, settlement of fishermen families and setting up of an aquarium in Port Blair, A reconnaissance survey has been conducted by the Pre-investment Survey of Fishing Harbours, Bangalore in 1977 for setting up of a fishing harbour at Great Nicobar. They have submitted their project report to Government of India and it is under consideration. By the implementation of these schemes it has been estimated that the annual production of fish will go up to 8590 tonnes per annum from the current fish landings of 1500 tonnes per annum.

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A small percentage of fishermen are also engaged in collection and catching of Prawns, Beche-de-mer, oysters, clams, lobsters, crabs, seaweeds and sea shells. Most of the crustaceans caught are consumed locally while seaweeds, Beche-de-mer and shells are mainly shipped to mainland.

A landing jetty of 231 m length was constructed with a total cost of Rs.67.18 lakhs at Phoenix Bay, Port Blair by the Ministry of Agriculture & Irrigation. This Jetty is being used for berthing of fishing vessels. Apart from this, a small jetty with anchorage facilities is also available at Port Blair for anchoring the country crafts. Programmes are also under-way for the construction of a building for processing and storage facilities near the jetty.

At present, the fish catches are sold locally in the market through the hawkers, fish merchants/ contractors and Fisheries Cooperative Marketing Federation. In the VI Five Year Plan, it is proposed to organize home marketing and supply system in the islands with the procurement of insullated vans and carrier boats with refrigerated holds and installation of a few fish stalls.

Non-mechanised boats are build locally by a few boat builders and private entrepreneurs. Also there are three boat building yards belonging to Marine and Forest Lepartments of these islands. No gear fabrication plant is available. The twines ad webbing are purchased from mainland factories and supplied to

fishermen by the department of Fisheries. Small gill nets, cast nets and other seine nets are fabricated by hand by the local fishermen.

There are about a dozen fishing villages in the islands but are not as organised as on the main land. In line with the programme for giving more encouragement to local inhabitants to come forward for commercialising the mechanised fishing each of the two Cooperative Societies formed by the fishermen will be provided with a 36 ft. boat under the scheme of subsidy-cum-hire purchase. No individual fishermen owns mechanised boats. About 480 fishermen are having country crafts. The income of these fishermen ranges from Rs.4000 to 5000 per annum. The Department is taking every possible action to settle the islands, floating fishermen in a proper area where the basic amenities will be provided.

For development of fisheries in these islands 21 schemes with a total cost of Rs.35.69 crores have been formulated and to be implemented during the VIth Five Year Plan period. Fishing boats are sup lied to fishermen and their Cooperative Societies on 70% subsidy-30% loan which would be refunded in 64 instalments during course of 8 years time. Fishing equipments are also supplied to fishermen on 60% subsidy. 200 fishermen families have been proposed to be settled by giving them house sites and financial assistance of Rs.4000/- per head out of which 50 percent is grant and 50 percent loan. Facilities like processing and

marketing of catch, repair facilities for fishing boats etc. are being provided under one of the schemes. Emphasis has been laid for giving professional fisheries training in various disciplines to the local qualified youths and fishermen. A Fishermen Training Centre has been established at Port Blair in 1977 with an intake capacity of about 30 local youths from the two main groups of Andaman and Nicobar Islands. A few are also being sent every year to the mainland institution for fisheries training. Candidates were sent to Lakshadweep for training in tuna pole-and-line fishing. A Fisheries Development Corporation is likely to be set up in Andaman & Nicobar Islands.

Fishing in these islands comes under the Fisheries Regulation 1938. Under this Regulation fishing without licence, which is issued by the Department of Fisheries, is an offence. Fishing has been restricted in tribal areas where the aboriginals are residing. Shell fishing grounds are auctioned at present once in two years under the Shell Fishing Regulation for collection and selling of shells of Turbo and Trochus from the islands to the mainland of India. There also exists a local shell craft industry thriving on these shells.

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